# COAL AGE

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## Our Opportunity

By Berton Braley

*Written expressly for Coal Age*

While the hosts at Armageddon know the awful blight of war
While the rifle bullets whistle and the cannon crash and roar,
We can look with bitter sorrow at the horror of it all
But we need not weep and mutter with our faces to the wall,
We are free of all the conflict which a war-mad monarch made,
And the world is ours to conquer with the mighty force of trade,
While the other powers struggle, with a continent at stake,
All their vast and eager markets are for us to win and take.

Now's the time for trade expansion, with prosperity the goal,
South America is calling for its huge supply of coal,
And a hundred other markets scattered round the surging sea
Look to us for prompt assistance—this is Opportunity!
Let us turn again to mining, cease to mourn in sodden woe,
For the war cloud has a lining with a richly golden glow,
While our rivals burn and slaughter, while their wealth and strength decrease,
WE can conquer distant borders with the glorious hosts of peace.

If we haven't ships, we'll buy them, if we cannot buy, we'll build,
Till the face of all the oceans with our merchant fleets is filled,
Till the flag that rode triumphant in the clipper days of old
Shall be fluttering at mastheads of our vessels manifold,
And the good black coal of commerce, wrested from the hill and plain,
Shall be sent in bulging cargoes forth upon the rolling main,
While the powers clash in conflict, while the shot and shell are hurled,
WE shall gain stupendous treasure from the markets of the world.

# The United States and the World's Coal Markets

The annual production of coal in the entire world is approximately 1, 350,000,000 short tons. The United States produces 575,000,000, or more than 42 per cent. Great Britain produces about 305,000,000, or 22 per cent., while Germany produces 265, 000,000, or 19 per cent. Other countries in their order of production are Austria-Hungary, 50,000,000; France, 45,000,000; Russia, 28,000,000; Belgium, 25,000,000 and Japan, 19,000, 000 short tons. It is true, therefore, that of eight countries producing 97 per cent. of the world's coal output, the only one not now engaged in war is the United States.

Great Britain is still producing a large tonnage, and is endeavoring to maintain her place as the world's most important exporter of fuel. Her foreign business in coal amounts to approximately 110,000,000 tons annually, leaving 195,000,000 tons for domestic use. There is no doubt but that production in Great Britain will be curtailed, but it is likewise certain that her domestic consumption will materially lessen, so that considerable coal will still be available for export. She has ships, and commands the seas, so that she must be regarded still as a most formidable competitor for the export business. The chief condition against her is the recent order prohibiting the export of her best Welsh grades. We doubt if importers will be satisfied with an inferior English coal.

In Germany, Austria-Hungary, France and Belgium, the coal industry is completely demoralized, only enough colliers being left in the mines to supply fuel for the railways, armament mills, and the more important national requirements. Japan can hardly supply enough coal for her own uses, so it is evident the United States and Great Britain must furnish the world's fuel while the present war continues.

The average consumption of coal in the principal countries of the world (excluding tropical countries) is approximately 4 tons per head of population. In the United States the consumption is greater than anywhere else, being 5.5 tons per inhabitant.

Four million men are employed in mining the world's coal, of which number 1,100,000 are British, 850,000 Americans, 710,000 Germans and 200, 000 are French.

South America alone needs $70,000,-000 worth of coal annually, of which amount at present the United States furnishes $5,000,000 and Great Britain, $55,000,000.

If the present time is not *the* supreme opportunity to make the United States the chief fuel exporting nation of the world, then surely the chance will never come.

# Shaft Ventilation at Butler Colliery

*SYNOPSIS—A 6x14-ft. fan direct connected to a steam engine, operating at 130 r.p.m. delivers 215,000 cu.ft. against a 2.8-in. water gage. The machine is operated continuously at this rate.*

Of the many mine-ventilating installations in the anthracite and bituminous fields of the United States, one of the most interesting is that of the Hillside Coal & Iron Co., at the Thomas shaft of the Butler colliery at Pittston, Penn.

A General View of the Top Works, Showing Fan House

Interest centers in this installation because of its high-efficiency as regards volumetric output and its exceedingly simple, but staunch, construction.

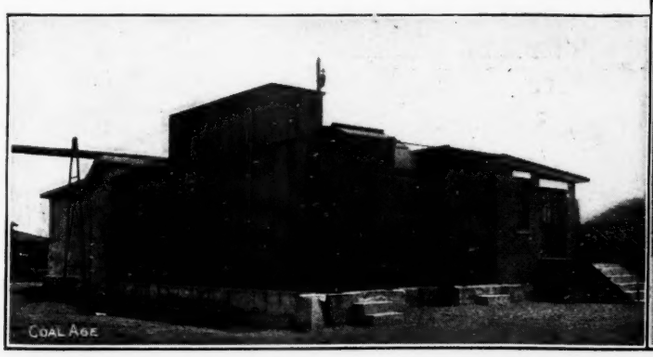
The fan—14 ft. in diameter, with a 6-ft. face—is of the double-inlet, exhaust, multivane type, with three-quarters steel casing and steel airways extending out to the concrete air shaft. For accessibility, the casing is provided with air locks through which the attendants can pass to oil and care for the machinery.

The main shaft, of 0.40 carbon steel, is 11 in. in diameter, and extends through the airways on one side to the direct-connected steam engine. The cast-steel fan hub, which is 30 in. long, is pressed on and keyed to the shaft. A center steel-plate disk is secured to the hub by fitted bolts in reamed holes. There are two steel-plate rings on either side of this center disk. The curved vanes are riveted to these rings.

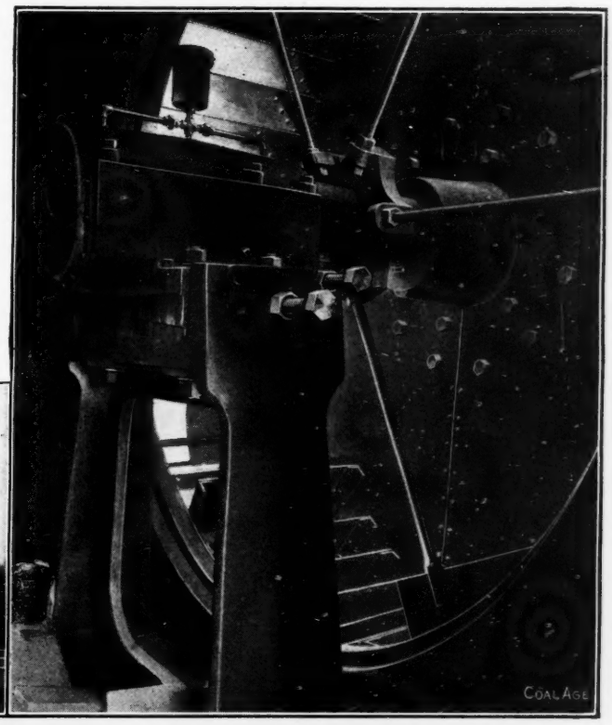
Heavy steel rods are riveted to the outside rings and extend to the shaft, where they are held in the cast-steel spider shown in one of the illustrations. The spider, which is keyed to the shaft, is an important factor in the maintenance of face alignment, in that it supports the adjusting nuts with which the steel rods are fitted.

The fan wheel is supported on its foundations by two heavy cast-iron pedestals. The tops of these pedestals are machined to form bearing surfaces for the adjusting wedges on which the journals rest. These are for vertical adjustment. Longitudinal adjustments are made by heavy setscrews. The main bearings are of the chain-oiling type, with an outer water jacket; this permits the connection of a water system for rapid circulation and cooling, when necessary. The bearings are liberal in their proportions and have large oil cellars.

The rigid steel construction of the fan wheel and the accurate balance that such a construction permits, has a definite engineering advantage beyond that of great strength with comparatively little weight, in that it allows a high peripheral speed, which results in large volumes of air at high water-gage readings.




Near View of Fan House and Casing




View Inside the Fan Casing, Showing Structure of Wheel and Pedestal Bearing

This fan is running continuously—24 hr. per day—and is delivering 215,000 cu.ft. of air per minute at 130 r.p.m., with a water-gage reading of 2.8 in.; at 190 r.p.m., the air delivery is increased to 315,000 cu.ft. and the water-gage rises to 6.2 in.

There is no question but what service of this nature is arduous in the extreme, since the fan has no opportunity for rest and it is strictly "up to" the design and workmanship, as well as the material, to keep the fan in service. This machine was designed and built by the Vulcan Iron Works, of Wilkes-Barre, Penn.

Butler colliery is known as one of the most modern in the anthracite field and is thoroughly equipped for handling its monthly production of 65,000 tons. It is within the system of the Pennsylvania Coal Co. and comes under the jurisdiction of W. P. Jennings, district superintendent at Scranton, Penn.

## Double-Entry System in Arkansas

SPECIAL CORRESPONDENCE

*SYNOPSIS—The single-entry system dies slowly in Arkansas, both miners and operators desiring in some cases to keep it in operation. The inspector is trying to get the courts to stop mines which are being worked without double entries.*

On Oct. 10, 1913, Thomas H. Shaw, the state inspector of mines, served notice on the Southern Anthracite Coal Mining Co., of Russellville, Pope County, Ark., to install the double-entry system as required by Section 7, Act No. 225, passed in 1905. The section reads:

> The owner, agent, lessee or operator of any coal mine in this state, if said mine is worked on the room-and-pillar plan, shall cause such work to be prosecuted in such mine in the following manner, to-wit: Two entries parallel with each other must be driven for the ingress and egress of the air, and crosscuts must be made at intervals not to exceed 40 ft. apart. Where gas exists, they shall be driven 30 ft. apart, or a crosscut be made at any other place ordered by the management to do so. No room shall be turned inside the last course cut*

The Southern Anthracite Coal Mining Co. drives only one entry instead of two. It opens from this double-necked rooms, which are 40 ft. wide. When the necks are in 12 ft. they are widened squarely toward each other till they meet, and as the rooms are driven up, a dirt wall is erected between the two-room roadways. Crosscuts are driven between the rooms 12 ft. from the entry.

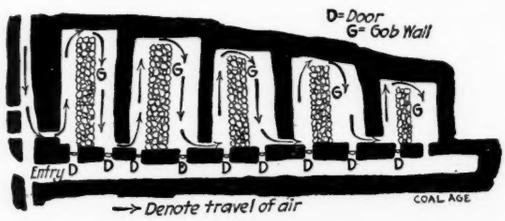
Doors were placed on the mouth of each roadway and the air is thus driven up one road and down the other, and so long as the doors are closed and tight, the ventilation is uninterrupted. But as soon as any doors are opened, all the air beyond becomes stagnant. In such cases, it is always found that at least one door is standing open. Seeing that only 100 cu.ft. of air per minute is required by law per man employed, it is easy to see that if this is provided when the doors were all duly closed, the current will be only barely sufficient to do the work. With doors frequently opened, the air must become extremely foul.

Another trouble arises from the fact that, as the air courses up to the face of every room, when a heavy shot of coal is made, it fills up the space between the rib and the gob wall, and largely prevents the air from circulating.

### WAS THE LAW VIOLATED?

Lee McDowell, the superintendent, declared that the system was in accord with the law and suggested that perhaps the breaking of the continuity of the air current by gob pillars in the counter airway composed of crosscuts and rooms, was the only manner in which the law was violated. So he proposed to cut the gob pillars and let the air circulate in a straight line through the initial crosscuts. The inspector insisted that this would only make conditions worse, as the air would then not circulate to the faces of the rooms.

Finally, the superintendent agreed to make a double entry, such as was doubtless contemplated by the framers of the bill, providing that the Ideal Anthracite Coal Mining Co. mining nearby was compelled to operate in a similar manner. W. H. Barrett, the general manager of the company, promised to do so and has kept his engagement, and Mr. McDowell agreed to do the same, but in April, 1914, he was still using the same system.




HOW SOME ARKANSAS MINES ARE STILL OPERATED

### THE MINERS SIDE WITH THE COMPANY

Five men elected by the local union of the United Mine Workers of America tried to get the inspector to meet them in the hope that they might persuade him to withdraw his objection to the method of working as they claimed it would reduce their wages if the work was done on the double-entry system. It is difficult to see how that could be. The inspector refused to meet the men, as the requirements of the law were not rightly, in his belief, a matter for compromise.

### LITTLE LAW AND NOT MUCH PROVISION FOR ENFORCEMENT

On Apr. 29, 1914, the inspector applied in the Circuit Court for an injunction to close the mine, alleging that it was dangerous for the workmen, owing to the foul air and the lack of ventilation to remove standing gas. Judge Basham ruled that he could not grant an injunction, as he was without jurisdiction, and he dismissed the case, so on May 9, 1914, the inspector sought to enjoin the Southern Anthracite Coal Mining Co. in the Pope County Chancery Court, to cease the operation of their mine, alleging dangerous conditions and open violation of the law. He also served notice on the prosecuting attorney, requiring him to prosecute the company for not ventilating the mine and for driving single headings in open violation of the law. The injunction was brought under Sec. 5349.

Chancellor Sellers ruled that the Act 225 of 1905,

*We suppose "ordered by the management to do so," means "when the management is ordered so to do by the mine inspector." "Course cut" is evidently an error and should be "crosscut."

amending the mining laws by implication, repealed the act granting the courts power to serve an injunction by which any company could be required to close its mine. He stated that the only remedy at law was to have the prosecuting attorney proceed against the company as a misdemeanant. In this case the company would possibly pay the fine and not discontinue its practice.

So the inspector has appealed to the Supreme Court to reverse the decision of the chancellor. If this court decides in favor of the chancellor's decision, the law rests entirely with the prosecuting attorney in this and other provisions and so far he has not shown any disposition to act in a case of this kind.

### The Miners Want the Inspector to Acquiesce

When the suit was commenced, the men supported the company. Thomas King, one of the organizers of the United Mine Workers of America, went to Russellville and "roasted" the men so severely that they changed their stand and quit work. After the decision, P. R. Stewart, district president of the Union, wired the inspector to meet him at Fort Smith, as Mr. McDowell was clamoring for the men to return to work. The inspector refused to modify his stand and the Union officials, being afraid to order the men to return to work in what was declared to be an unsafe mine, left it open to the men to do as they pleased and they have returned to work.

A few of the larger companies have shown a disposition to comply with the law, but the rest are unwilling to do so, inadequate as it is in many of its details.

## Belgian Coal Exports

Coal is the greatest by far in quantity of any article exported from Belgium, and is sent for the most part to France, which received 4,340,500 tons in 1911. Germany received 293,000 tons, and the Netherlands 266,000 tons, the remainder being in small quantities, the chief of which is 113,000 tons to Luxemburg. As a Consular Report (British) indicates, the total figure is largely composed of bunker coal placed on board vessels bound to the countries to which it is credited as exports in the statistical returns. The exports of Belgian coal during the years 1902-11 were:

| Year | Quantity in Tons | Year | Quantity in Tons |
|---|---|---|---|
| 1902 | 5,073,000 | 1907 | 4,732,000 |
| 1903 | 4,923,000 | 1908 | 4,754,000 |
| 1904 | 5,067,000 | 1909 | 5,077,000 |
| 1905 | 4,705,000 | 1910 | 4,973,000 |
| 1906 | 4,972,000 | 1911 | 5,169,000 |

**The least objectionable feature of boiler soot is that it is unburned fuel. The worst features are its ability to screen the boiler tubes from the heat, the quantity of sulphur in it which corrodes the tubes, and its interference with draft so that a greater pressure has to be put on the fire.**

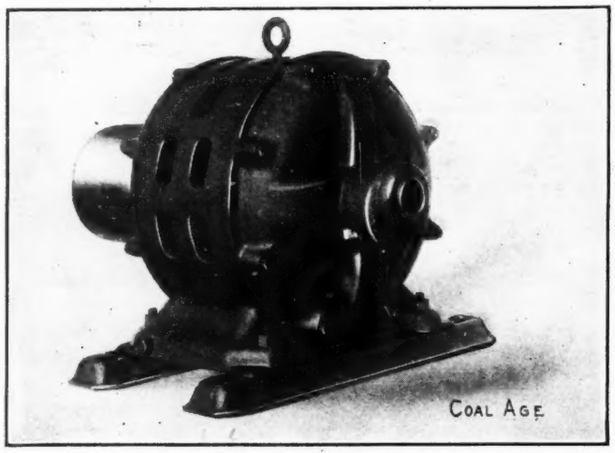
The Miner—Guess I'll Stick and Play Safe

# A Two-Speed Alternating-Current Motor for Mine Ventilation

By William H. Easton*

*SYNOPSIS—It is often advantageous to vary the speed of mine fans. With direct current this is easily accomplished. Where alternating current must be employed, a slip-ring motor gives the required speed variation, but is subject to some serious shortcomings. The two-speed induction motor is perhaps on the whole the machine best adapted to fan driving when constant speed is undesirable.*

It is frequently desirable to alter the speed of motors driving mine fans. Less air is required at nights and on holidays than while work is in progress, and a reduction in the speed of the fan at such times effects




The Two-Speed Motor Complete

a decided economy. Again, an increased volume of air is demanded from the fan as extensions below ground are made, and this extra supply is most easily obtained, up to a certain limit, by increasing the normal speed of the fan.

When a direct-current motor is used for fan driving, no difficulty arises as to speed changes. The speed of a direct-current motor can be readily varied over a wide range in any desired number of steps.

But the increasing use of alternating current from central stations and the many desirable features of the motors using this energy supply—such as reliability, simplicity and ability to utilize current of a high voltage—have developed a demand for a suitable alternating-current motor for fan drive, one of the characteristics of which should be speed variation.

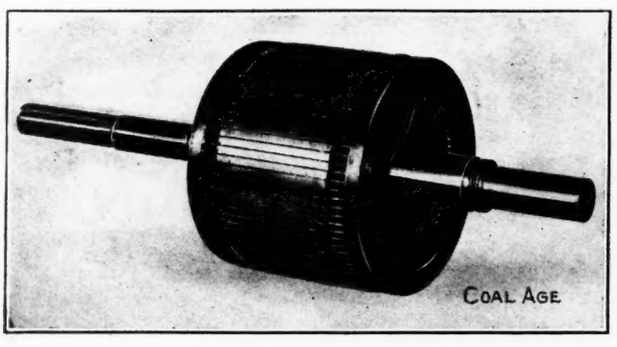
This demand has created a serious problem for the motor manufacturers to consider, because the alternating-current motor does not lend itself readily to speed variation. The ordinary squirrel-cage motor, for example, well suited to mine service in many respects, is essentially a constant-speed machine, and no method of changing its rotational velocity is now considered practicable.

With the slip-ring (or wound-rotor) motor, speed variation can be obtained by introducing resistance into the rotor circuit. For this purpose, a drum controller is employed and resistance connected into the rotor circuit through the slip rings. For services where the operation is intermittent and the motor runs on low speeds but a short total time each day, as in hoist, crane and elevator service, this type of machine is eminently satisfactory. But where operation on low speeds for long periods of time is necessary, the slip-ring motor becomes uneconomical because much energy is wasted in the resistance.

Thus a 20-hp. slip-ring motor has an efficiency of 87 per cent. when driving a fan at full speed. But when operating the same fan at half speed, its efficiency (including losses in the resistance) drops to 37 per cent., which means that but little more than one-third of the total power received (and paid for) is being transformed into useful work.

When the fan must run at a slight speed reduction or at low speeds for short periods only, a slip-ring motor can be recommended. But for long operation on low speed, some more efficient substitute should be found.

One type of motor that has proved entirely satisfactory whenever it is applicable is the two-speed squirrel-cage induction motor. This has been used extensively for machine-tool and other service, and has been applied to mine-fan drives for years, although it has only recently become conspicuous in this latter field. This motor is similar in its mechanical construction to the ordinary squirrel-cage machine. It has the same simple and reliable mechanical construction throughout. It has only two wearing parts, the bearings; it has no sliding electrical contacts, and its rotor is practically indestructible. The stationary windings are arranged differently, however, although they are mechanically just as strong and




Rotor of the Two-Speed Motor

present no outward differences with the exception of the fact that a greater number of leads are brought out.

### The Operation Is Simple

The method of operation of this machine is simple. The speed of any squirrel-cage motor depends on the number of its "poles." Thus, on a 60-cycle circuit, a two-pole motor has a no-load speed of about 3600 r.p.m.; a four-pole motor, 1800 r.p.m.; an eight-pole motor, 900 r.p.m., etc. It is therefore evident that by changing the num-

*Westinghouse Electric & Mfg. Co., East Pittsburgh, Penn.

ber of poles, the motor speed can be varied proportionately.

This is what is done on the two-speed motor. The windings of the stationary part are so arranged that by connecting them in one way a certain number of poles is formed; while by changing the connections, twice the number of poles is secured and the speed is reduced to one-half. The horsepower is also reduced one-half. In either condition, the motor's operation and characteristics are similar to the ordinary squirrel-cage machine having the same number of poles.

The reason why this type of motor is particularly suitable for fan service is that half speed is just the reduction that many mines require during nights and holidays. Hence its range of application is broad.

In this machine, the excellent mechanical features of the ordinary squirrel-cage motor are retained intact, as mentioned above, no commutator or other complication requiring attention being necessary.

The change in connections is effected in the simplest possible manner. A double-throw knife switch is provided, which when placed in one position, gives one speed, and in the other gives the second speed. Otherwise, it is started in the same manner and with the same appliances as the ordinary squirrel-cage motor.

The efficiency of operation on low speed is excellent, being nearly the same as that on high speed. The reduction of horsepower at low speed is of no consequence in fan driving, since the power required to operate a fan falls off rapidly as the speed is decreased.

Gradual increase in the speed of the fan to keep pace with extensions is taken care of by changing the motor and fan pulley ratios to give a higher fan speed as development work progresses.

It will be noted that the two speeds provided by this motor are as 2 to 1. This is the most practical condition for this type of machine. In this case, the entire winding of the motor can be used for both speeds; hence the machine is economical both to build and to operate. Were the ratio different, say 3 to 1, two separate windings would have to be used, one providing three times the number of poles that the other secures. Such a motor is expensive to build and its operating efficiency is not so good, although it has been used in many installations. An interesting instance is a 4 to 1 speed motor, where two two-speed windings are employed, giving no-load speeds of 1800, 900, 450 and 225 r.p.m.

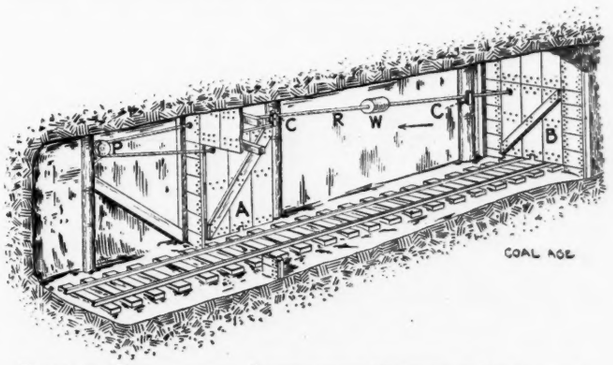
The two-speed 2 to 1 motor, however, fills the demand for ventilating service so well and has so many specific advantages that it is certain to become a feature of the electrical equipment of coal mines.

## The Ramsay Mine-Door Closer

The setting open of a mine door, through the thoughtlessness, carelessness or malicious intent of mine workers, is not only a source of continual annoyance to the officials in charge of the ventilation of the mine, but is a menace to the safety of the men working therein.

The purpose of a door erected in a main airway or in a crosscut between two airways, one of which is the intake and the other the return, is for the purpose of permitting the passage of men and animals and preventing the air current from short-circuiting at this point. Such doors are called "division doors" when placed in the crosscut between the main intake and return airways of a mine. At all such important points, two doors or, as we say, "double doors," are erected in the same crosscut. The purpose of the double doors is to prevent the momentary short-circuiting of the air when one of the doors is open for the passage of men or animals. One of these doors should always be closed when the other is open, so as to prevent the air current from short-circuiting at such a time.

The accompanying sketch shows a device, recently invented by Thos. Ramsay, mine foreman for the Northwestern Improvement Co., Roslyn, Wash. It consists of a rope or wire *R*, of sufficient strength, attached to and connecting two mine doors *A* and *B*, located in a crosscut between the intake and return airways. Between the doors, the rope is supported by two pulleys *CC* and, passing through a hole in the brattice at the door *A*, is carried over a tail-pulley *P* and attached to the inby or




RAMSAY DEVICE FOR OPERATING DIVISION DOORS IN MINES

return side of the door *A*. As shown in the cut, a heavy weight *W* is attached to the rope between the carrying pulleys *CC*, its purpose being to take up any slack in the rope and to keep the doors closed, should either of them be opened by accident or by heavy concussion of the air. From a study of this arrangement, it is evident that only one of the doors *A* and *B* can be opened at one time, and the short-circuiting of the air when men or animals are passing through the doors is thereby prevented.

This device has been in successful use for several months in one of the mines of the Northwestern Improvement Co., at Ronald, Wash., where it was installed to test its practicability in the mine. As a result, its practical working and usefulness for the purpose, intended have attracted much attention and favorable comment.

## A New Dust-Laying Fluid

British engineers have met the dust problem in a unique way. Nature's way of laying dust is to turn it into sandstone or clay by slow infiltration of colloid fluids. Man needs to do the same quicker. In the F pit of the Washington Coal Co., southeast of Newcastle-on-Tyne, there was shown on Mar. 21 a commercial scale trial of the new Belger colloid dust-laying process.

About 400 yd. of a main haulageway, along which pass 1000 tons of coal a day, had been sprayed with the Belger fluid during the previous two months. The fluid, whose main components are glue and a 40 per cent. solution of calcium chloride, is sprayed from a 100-gal. tank, devised by A. Owen Jones.

This tank can come down the shaft in the cage and

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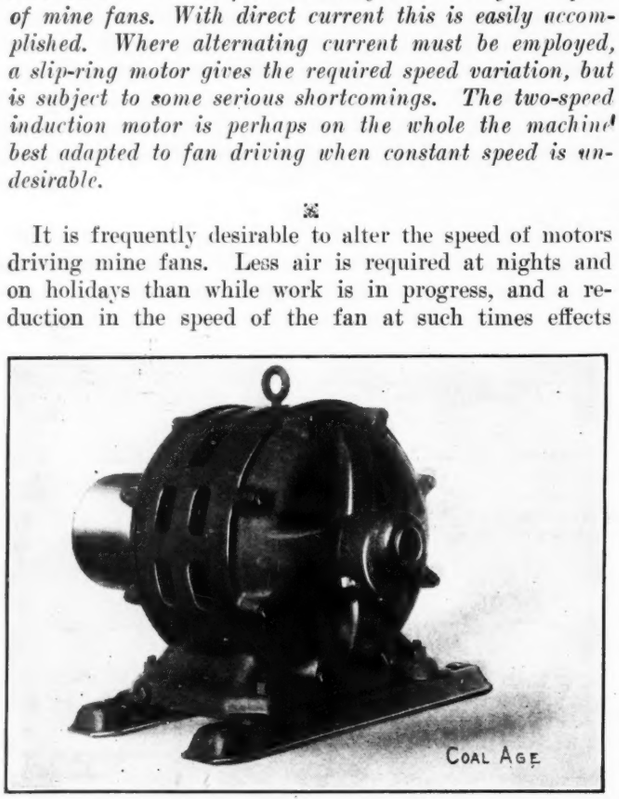


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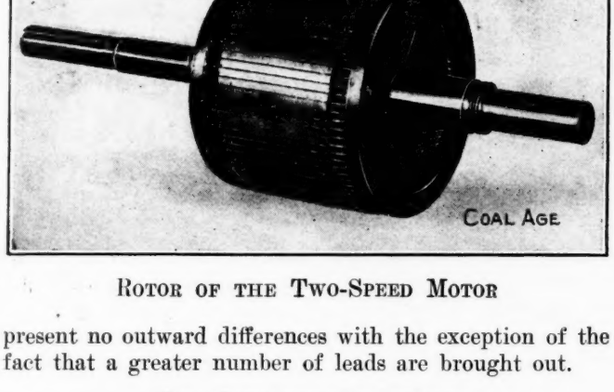


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This is what is done on the two-speed motor. The windings of the stationary part are so arranged that by connecting them in one way a certain number of poles is formed; while by changing the connections, twice the number of poles is secured and the speed is reduced to one-half. The horsepower is also reduced one-half. In either condition, the motor's operation and characteristics are similar to the ordinary squirrel-cage machine having the same number of poles.

The reason why this type of motor is particularly suitable for fan service is that half speed is just the reduction that many mines require during nights and holidays. Hence its range of application is broad.

In this machine, the excellent mechanical features of the ordinary squirrel-cage motor are retained intact, as mentioned above, no commutator or other complication requiring attention being necessary.

The change in connections is effected in the simplest possible manner. A double-throw knife switch is provided, which when placed in one position, gives one speed, and in the other gives the second speed. Otherwise, it is started in the same manner and with the same appliances as the ordinary squirrel-cage motor.

The efficiency of operation on low speed is excellent, being nearly the same as that on high speed. The reduction of horsepower at low speed is of no consequence in fan driving, since the power required to operate a fan falls off rapidly as the speed is decreased.

Gradual increase in the speed of the fan to keep pace with extensions is taken care of by changing the motor and fan pulley ratios to give a higher fan speed as development work progresses.

It will be noted that the two speeds provided by this motor are as 2 to 1. This is the most practical condition for this type of machine. In this case, the entire winding of the motor can be used for both speeds; hence the machine is economical both to build and to operate. Were the ratio different, say 3 to 1, two separate windings would have to be used, one providing three times the number of poles that the other secures. Such a motor is expensive to build and its operating efficiency is not so good, although it has been used in many installations. An interesting instance is a 4 to 1 speed motor, where two two-speed windings are employed, giving no-load speeds of 1800, 900, 450 and 225 r.p.m.

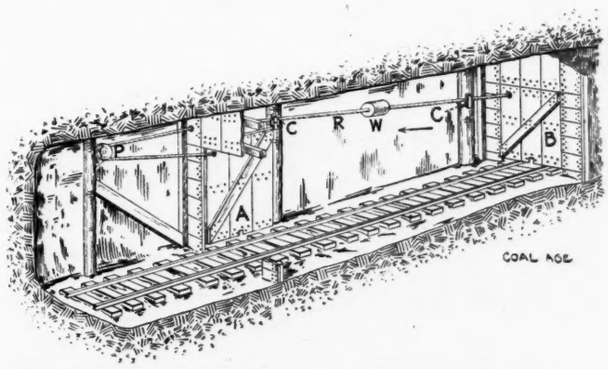
The two-speed 2 to 1 motor, however, fills the demand for ventilating service so well and has so many specific advantages that it is certain to become a feature of the electrical equipment of coal mines.

## The Ramsay Mine-Door Closer

The setting open of a mine door, through the thoughtlessness, carelessness or malicious intent of mine workers, is not only a source of continual annoyance to the officials in charge of the ventilation of the mine, but is a menace to the safety of the men working therein.

The purpose of a door erected in a main airway or in a crosscut between two airways, one of which is the intake and the other the return, is for the purpose of permitting the passage of men and animals and preventing the air current from short-circuiting at this point. Such doors are called "division doors" when placed in the crosscut between the main intake and return airways of a mine. At all such important points, two doors or, as we say, "double doors," are erected in the same crosscut. The purpose of the double doors is to prevent the momentary short-circuiting of the air when one of the doors is open for the passage of men or animals. One of these doors should always be closed when the other is open, so as to prevent the air current from short-circuiting at such a time.

The accompanying sketch shows a device, recently invented by Thos. Ramsay, mine foreman for the Northwestern Improvement Co., Roslyn, Wash. It consists of a rope or wire *R*, of sufficient strength, attached to and connecting two mine doors *A* and *B*, located in a crosscut between the intake and return airways. Between the doors, the rope is supported by two pulleys *CC* and, passing through a hole in the brattice at the door *A*, is carried over a tail-pulley *P* and attached to the inby or




RAMSAY DEVICE FOR OPERATING DIVISION DOORS IN MINES

return side of the door *A*. As shown in the cut, a heavy weight *W* is attached to the rope between the carrying pulleys *CC*, its purpose being to take up any slack in the rope and to keep the doors closed, should either of them be opened by accident or by heavy concussion of the air. From a study of this arrangement, it is evident that only one of the doors *A* and *B* can be opened at one time, and the short-circuiting of the air when men or animals are passing through the doors is thereby prevented.

This device has been in successful use for several months in one of the mines of the Northwestern Improvement Co., at Ronald, Wash., where it was installed to test its practicability in the mine. As a result, its practical working and usefulness for the purpose, intended have attracted much attention and favorable comment.

## A New Dust-Laying Fluid

British engineers have met the dust problem in a unique way. Nature's way of laying dust is to turn it into sandstone or clay by slow infiltration of colloid fluids. Man needs to do the same quicker. In the F pit of the Washington Coal Co., southeast of Newcastle-on-Tyne, there was shown on Mar. 21 a commercial scale trial of the new Belger colloid dust-laying process.

About 400 yd. of a main haulageway, along which pass 1000 tons of coal a day, had been sprayed with the Belger fluid during the previous two months. The fluid, whose main components are glue and a 40 per cent. solution of calcium chloride, is sprayed from a 100-gal. tank, devised by A. Owen Jones.

This tank can come down the shaft in the cage and

is then placed on wheels. The air used is at a pressure of about 2 atmospheres. It enters the tank by several small openings, so as to churn the fluid into foam, and a small jet of air is led into the outflow pipe to help the treacly liquid to become spray. The nozzles are of rubber, to enable solid particles to pass.

Humorists said the Belger process meant making the miners walk on flypaper, and any looker-on whose hand was accidentally sprayed found himself collecting every speck of dust which came near him for the rest of the day. But the track where the process has been used feels like a peaty path in dry weather, being slightly springy and not at all sticky.

Outside the sprayed area the track is several inches deep in fine dust. The sprayed roof and walls are sticky and look for a week or two as if whitewashed, then the gathering dust blackens them, but it does not appear that a fresh spraying will be needed for three months. The liquid is used warm, at 50 deg. C. to lessen its surface tension, but the spraying is not followed by evaporation, so no falls of roof result. Indeed, the liquid preserves rock from erosion and timber from decay, and does not, like water, encourage ankylostomiasis and other low forms of life.

The cost of using this spray in coal mines is about 50c. per yard per year.

## A Pipe Flume for Mine Water

By H. M. Kanarr*

In the development of the Trout Run Mine of the Jefferson & Clearfield Coal & Iron Co., near Reynoldsville, Penn., a heading was driven to the dip to daylight, which provided drainage for almost the entire mine. The water from this heading was liberated on a branch of the stream which supplied the Eleanora Mine of the Rochester & Pittsburg Coal & Iron Co. with water for the boilers.

In order to avoid contaminating this water supply, the water from Trout Run Mine was carried past the Eleanora dam by means of a surface ditch which followed the contour of the hillside for almost its entire length of 3600 ft., except at one point where it became necessary to carry it across a ravine for a distance of about 100 ft.

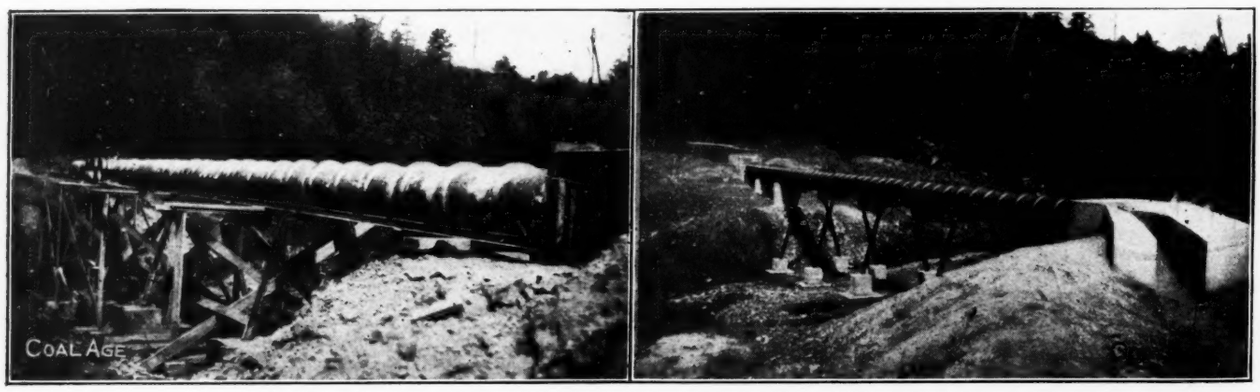
This was done by means of a flume composed of 18-in. sewer pipe supported on 35-lb. mine rails, which in turn were carried by bents composed of 60-lb. rails bent so as to give a batter on the legs of 3 in. in 12 in. and embedded in concrete piers cast around the base.

### Details of Construction and Advantages of the System

The longitudinal rails were bolted together with fishplates, and also fastened securely to each bent with U-bolts. A concrete entrance and discharge were provided so as to give some head to the water entering the flume, and to properly release it at the lower end. No bracing of any kind was used on the bents, but the flume was trussed longitudinally with two 1¼-in. mine-haulage ropes passing over each bent and under a 12-in. I-beam bolted to the 35-lb. rails at mid span. The ropes were secured to the concrete walls at one end by means of eyebolts embedded in the concrete, and at the other by a turnbuckle, part of which was similarly embedded, and which formed a convenient means of bringing the flume to a uniform grade.

The spans were 14 ft. center to center, but could have been longer if desired, as the flume was amply strong for longer spans. The character of the country in which it was built is shown by the accompanying photographs, one of which was taken to show the method of construction, the other showing the finished flume, looking up stream.

The advantages of this construction are that the flume contains no inflammable material and will not be endangered by forest fires. It will last considerably longer than a timber structure, and was cheaper and more quickly built. The joints of the pipe were cemented and should carry water better than timber, which would be subject to weather changes.




The Flume during Construction and after Completion

The cost of the finished structure is given by the superintendent in charge, as follows:

| | |
|---|---|
| Labor | $162.54 |
| Cement, 21½ bbl. at $1.40 | 30.10 |
| Sand | 22.95 |
| 102 lin.ft. of 18-in. sewer pipe | 58.14 |
| Total | $273.73 |

The completed flume was painted black and the sewer pipe red, making a pleasing contrast and a job which would add to the appearance of any plant, but which in this case must "blush unseen" to a great extent, due to its isolated location.

*Chief engineer, Rochester & Pittsburgh Coal & Iron Co., Punxsutawney, Penn.

# Common Sense and Economy in Fan Ventilation

By J. C. Gaskill*

*SYNOPSIS—An excessive amount of air unnecessary for the proper ventilation of a mine. Circulation under a low water gage desirable. Necessary requirements to produce a low mine gage. The need of two or more main intake and return airways shown by several illustrations in actual practice. The saving in fuel consumption shown to be important.*

In the following article, I, first, want to give some facts relating to the conditions we have met in mine ventilation in respect to the distribution of the air in the mine. Most readers are to some extent familiar with mine ventilation, but it is probable that many do not understand what constitutes *good* ventilation in the mine.

First, it is not necessary for a mine to have an excessive volume of air in order to be properly ventilated; but it should have a sufficient quantity to give to each of the air splits what air is needed. Air splits are necessary in order to avoid using doors on the main-haulage roads. This quantity of air should be furnished with a reasonably low water gage. The question of what constitutes a "low water gage" will depend on the quantity of air required, the length of the airways, number of air splits and the daily output of the mine.

For example, take a mine producing, say from 400 to 500 tons of coal per day. This mine can be ventilated with a 3x12-ft. fan that will deliver from 50,000 to 55,000 cu.ft. of air per minute. It is possible to do this with one main airway, providing the distance to the first air split is not too great. It must be remembered, however, that as the cross-headings are worked out and abandoned, the distance to the first split increases; and, instead of a 1-in. water gage, there is now required a 3-in. gage to circulate the same air volume. Moreover, a larger volume of air is now required.

After due consideration, it is decided to install a high-pressure fan, which, it is believed, will give the necessary air volume. It often happens that when this installation has been made at a large expense, the result is only partially satisfactory and the blame is laid on the fan, when, as a matter of fact, the real trouble lies in the main airway, which is too small for the growing requirements of the mine. Instead of a single main airway, there should now be two airways, which would pass the same volume of air under one-fourth the water gage. The horsepower required for the circulation would likewise be reduced to one-fourth of the power required for a single airway. This refers, of course, to the horsepower consumed in the main airways only.

## A Comparison of Duplicate Fans

The Consolidation Coal Co. is at present operating two fans of the same make and duplicates of each other, in every respect. In October, 1910, one of these fans was installed at Mine No. 43, that had, at that time, been in operation about 18 years. There were four main-return airways, each 7x10 ft. in section and 4000 ft. long. Up to this time, the mine had been ventilated by a Capell fan, 8 ft. wide and 11 ft. in diameter, running at a speed of 224 r.p.m. This fan was now replaced by another 6 ft. wide and 20 ft. in diameter, which delivered 202,320 cu.ft. of air per minute, under a 3.5-in. water gage, at a speed of 90 r.p.m. This yield would correspond to 100,000 cu.ft. per min., under a water gage of 0.855 in., which shows a volumetric efficiency of 119 per cent. The peripheral speed of the new fan, at 90 r.p.m., is 5654 ft. per min. To deliver the same quantity of air, under the same gage, requires a peripheral speed of 7728 ft. per min., showing an increase of 2086 ft. per min., in favor of the new fan.

The duplicate 6x20-ft. fan, to which I have referred, was installed at Mine No. 119, in 1912. This mine had then been in operation six years. It had three return airways, each 3 ft. 8 in. high by 16 ft. wide. The distance from the air shaft to the first air split was 4200 ft. on the intake; and the corresponding distance on the return was 3800 ft. At a speed of 71 r.p.m., this fan delivers only 71,000 cu.ft. per min., against a 1.9-in. water gage, which corresponds to a circulation of 100,000 cu.ft. per min., against a 3.77-in. water gage; or 200,000 cu.ft. per min., against a 15-in. water gage, which shows a volumetric efficiency of only 53 per cent.

These data afford a practical illustration of two fans that are duplicates in every respect, but operated under conditions that differ widely in regard to the mine. In both cases, the fan shaft is 10x12 ft. in section and about 60 ft. deep. While the first fan has proven all that was expected and yields a volumetric efficiency of 119 per cent., the second fan gives an efficiency of only 53 per cent. The comparison of these tests proves conclusively that the mine conditions determine very largely the efficiency of the ventilating fan.

It may be stated that both fans were built under a guarantee of 250,000 cu.ft. per min., against a 6-in. water gage. The fan installed at Mine No. 43 would deliver 250,000 cu.ft. per min., under a 5.34-in. water gage, as estimated from the yield previously mentioned; but the fan installed at Mine No. 119, estimating on a similar basis, would show a water gage of 23.56 in., for a circulation of 250,000 cu.ft. per min. The conclusion is that the dimensions of this fan are not adapted to the mine it is designed to ventilate. We are now adding two airways in this mine, which will reduce the water gage and yield conditions better adapted to the fan. It is only fair to state that this result was anticipated in the plan of the mine, which was arranged to provide for the additional airways when required.

## Preparing Specifications for Mine Fans

It is a common thing for the mining engineer to be called upon to prepare specifications for a mine fan, for service at a particular mine, and to invite bids for the erection of the same. The specifications are based on a stated requirement of, say 250,000 cu.ft. of air per minute, against a 6-in. water gage. A manufacturer in

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presenting his bid will often state that he can do better than what the specifications ask, often claiming that the dimensions given are too great and the fan unnecessarily large. Where the manufacturer is left to make his own estimate of the size of fan required, he will often make no inquiries in reference to the size of the mine airways or the present circulation in the mine; but will take chances in reference to these important data. In nine cases out of ten the new fan is installed at a new mine, where, owing to the short airways of ample size, it continues to do good work for a few years. In the later development of the mine, however, there is experienced a scarcity of air, and, referring to the guaranteed capacity of the fan, the superintendent orders the mine foreman to speed it up, claiming that it is not run at its full capacity. The results are still far from satisfactory, but the fault is not with the fan, which is now forced to operate under conditions for which it was not designed.

### Calculation of Horsepower Required

A short familiar calculation of the pressure required to pass a given quantity of air through an airway of given dimensions, using the Fairley coefficient ($k = 0.00000001$), shows that a water gage of 1.9 in. is required to pass 100,000 cu.ft. of air per minute through an airway 7x10 ft. in section, for each 1000 ft. in length. Suppose the main airway in the mine is 3000 ft. long to the first point of split. The distance the main air current must traverse, including the return, is then 6000 ft., and the water gage required, for the passage of the main airways only, is $6 \times 1.9 = 11.4$ in. It is clear at once to any mining engineer or foreman that it would be impracticable to attempt to pass 100,000 cu.ft. of air through a single airway of this size for a distance of 6000 ft., including the return. By providing two airways of this size for the intake and two airways for the return, both the water gage and the power on the air would be reduced to one-fourth of the previous amount.

By this means, a main air current of 100,000 cu.ft. per min. can be conducted a distance of 3000 ft. to the first point of split and returned to the upcast, under a water gage of 2.85 in., requiring 45 hp. This is the horsepower on the air consumed in the main airway. These are the more important calculations in estimating the requirements of the mine in respect to ventilation. To these amounts, however, must be added the water gage and power consumed in the splits.

Finally, to determine the power of the engine driving the ventilating fan, it is customary to assume an efficiency of 60 per cent. For example, if the entire horsepower on the air, for the main airways and splits, is, say 60 hp., the required horsepower of the engine would be $60 \div 0.60 = 100$ hp. A similar calculation shows that a water gage of 5.08 in. and 160 hp. on the air are required to pass 200,000 cu.ft. per min. in three airways, a distance of 6000 ft.; but, using four airways, the same air volume, circulated the same distance, will only require a water gage of 2.85 in. and 90 hp. on the air.

### Saving in Fuel Consumption

Assuming a consumption of 5 lb. of coal per hp. per hr., the saving of $160 - 90 = 70$ hp., by employing four instead of three main airways, would correspond to a saving in fuel of $5 \times 70 = 350$ lb. of coal per hour, or 1¾ tons in 10 hr., which figures are a fair approximation to fact, in actual practice. Assuming, then, a saving of 3 tons of coal per day of 24 hr. (less fuel being consumed during the night, when the mine is not working), at a cost of $1 per ton for coal at the mines, the total saving per month would be practically $3 \times 30 = 90$ tons or $90 per month, at the least computation.

### Economy of Low-Water Gages

Experience suggests that economical ventilation requires that the water gage be kept down to at least 1 in. per 100,000 cu.ft. of air in circulation. As has often been suggested before, this can be done by properly splitting the air current in the mines. Experience leads me to suggest further, that for the circulation of from 80,000 to 100,000 cu.ft. of air per minute, two main intakes and two return airways should be provided; or three main airways for a circulation up to 150,000 cu.ft. per min.; and four main airways for a circulation up to 200,000 cu.ft. per min., the sectional area being 70 sq.ft. If this plan is followed, a great saving in coal will be found to result. It is important, in overcasting the air, to see that all air bridges on main airways are substantially built so as to prevent the leakage of air. Such overcasts and all stoppings on main airways should be built of concrete, for the same reason.

For the last ten years, it has been the policy of the Consolidation Coal Co., when opening a new mine, to make the projections on the maps of that mine, with enough intakes, returns and overcasts, to ventilate the mine under a low water gage. Where old mines were contending with a high water gage, air shafts were sunk, in order to shorten the airways and lower the water gage. At Mine No. 26, an air shaft was sunk 11,700 ft. from the mouth of the mine, and a new 6x20-ft. fan and a boiler plant installed. By installing the fan at this last location, it shortened the airway one-half, besides permitting the two return airways to be used as outlets or intakes, as required, thus providing four inlets in place of two, as before. Previous to the change, this mine had but two inlets and two returns. By moving the fan, the water gage was reduced from 3 in. for 100,000 cu.ft., to 1.36 in. for the same air volume, a splendid demonstration of the practical value of shortening airways. It will be noticed that 1.36 in. water gage is too high for a circulation of 100,000 cu.ft. of air, as, in case 200,000 cu.ft. were required, the necessary gage would be 5.44 in., which is far too high for everyday practice. It may be possible that this is the best that can be done with an old mine sometimes.

In estimating the saving of coal effected by moving this fan, the calculation is based on the difference in actual total horsepower required of each engine, which is 123 hp. for 150,000 cu.ft. of air. Five pounds of coal per hp. per hr. then means 615 lb. of coal per hr., or 14,760 lb., or, say 7.4 net tons per day of 24 hr. Coal at $1 per ton then means $7.40 per day, or $222 per month and $2664 per year. The water gage on the new fan will be 3.06 in. for 150,000 cu.ft. of air; while on the old fan, it would require a 6.75 in. water gage for the same air volume. The new mines opened by this company in the West Virginia coal field are three, namely, Nos. 63, 32 and 84.

Mine No. 63 was opened about eight years ago, and an 8x20-ft. fan was installed. The mine inspector's report states that on Oct. 17, 1912, this fan was delivering

151,510 cu.ft. of air, at 70 r.p.m., against a 1.8-in. water gage. This would equal a 0.78-in. water gage for 100,000 cu.ft. of air; or a 3.13-in. gage for 200,000 cu.ft. of air.

Mine No. 32 has been opened for three years. It has a 6x20-ft. fan, which was but recently started. The mine inspector's report of Sept. 26, 1912, states that this fan delivered 108,000 cu.ft., at 48 r.p.m., against a 0.6-in. water gage, which is equal to a 0.514-in. gage for 100,000 cu.ft. of air, or a 2.056-in. gage for 200,000 cu.ft. of air. It must be remembered that this mine is new and the airways are short.

Mine No. 84 has no large fan yet, but has four return and four inlet airways 7x10 ft.

Mine No. 43, which has been referred to before, at present shows a rising of the water gage. The mine inspector's report of Oct. 16, 1912, states that this 6x20-ft. fan is furnishing 171,424 cu.ft. of air, at 84 r.p.m., against a 3.2-in. water gage, which is equal to a 1.09-in. gage for 100,000 cu.ft. of air, or a 4.37-in. water gage for 200,000 cu.ft. of air. An air shaft is being sunk at a point 8500 ft. from the mouth of the mine to relieve this high water gage.

### Installation at an Old Mine

At Mine No. 3, Frostburg, Md., the Consolidation Coal Co. had a 6x20-ft. fan installed, some three years ago. This is a very old mine, with large airways. The mine inspector's report of Oct. 13, 1912, states that the fan at this mine is delivering 120,000 cu.ft., at 68 r.p.m., against a 1.1-in. water gage, which would equal a 0.76-in. water gage for 100,000 cu.ft. of air, or a 3.04-in. water gage for 200,000 cu.ft. of air.

There are some things concerning this fan to which I wish to call attention. The blades were set in backwards, by error of the builders. The mistake was not discovered until after the fan had been completed and running for some time. When the maker of the fan came to test it, he found that they had made this error and the fan was running the wrong way. It was left to me to say whether the maker should take down the fan and rebuild it correctly or not. I had not seen the fan since its erection, and in making an examination found that a part of the housing surrounding the fanwheel would have to be taken down. This wall consisted of brick and concrete, no steel being used. I decided that, inasmuch as the fan was doing good work, I would let "well enough" alone. That was three years ago, and I believe that this is one of the best fans the company owns.

From the foregoing presentations and arguments, it will be seen that all fans will deliver air against a low water gage. Some fans have a larger volumetric efficiency than others, which is a good thing, as such fans can be run at a slower speed and make the same water gage.

### Economical Policy in New Coal Fields

The Consolidation Coal Company has adopted a different method for the ventilation of its new coal field in the Elkhorn Division, Kentucky. The mines are all projected on the map of the coal field, showing the mines about as they will be, and giving the amount of coal they expect each mine to produce and the amount of air they expect to put into each mine. Then the proper number of airways are projected on the map, together with all overcasts, so as to handle this amount of air with a given water gage. The large mines from which it is intended to produce not less than 2000 tons of coal per day, are expected to require about 200,000 cu.ft. of air per minute when the mine becomes fully developed.

In these large mines, we have four return airways and four intakes, each of which will average 6½ ft. high by 10 ft. wide, making an area of 65 sq.ft. each. From the fan to the first split is generally about 1200 ft., and here two double-face headings are turned off—two to the right at about 1200 ft. and two to the left at about 1320 ft.—so the switches will not interfere, as the face headings are turned with a 112-ft. radius curve. Each of these two face headings will have about four room headings, making eight room headings for each 25,000 cu.ft. of air. The four room headings will be ventilated with one split of air, say about 12,500 cu.ft. to each four room headings, which will be about 1000 ft. long. Face headings will be turned every 2100 ft., center to center, and room headings are then to be turned both ways from the face heading.

The water gage that will be required in passing 200,000 cu.ft. of air to the first, second, third and fourth splits, there being four return airways and four intake airways, is estimated as follows: The distance to the first split of air is, say 1260 ft., an average between the two face headings where 50,000 cu.ft. of air goes to the four face headings. Using Fairley's coefficient of friction ($k = 0.00000001$), the water gage for 200,000 cu.ft. of air up to this first split will be

$$w.g. = \frac{0.00000001 \times 1260 \times 2(6.5+10) \times 200{,}000^2}{5.2\ (6.5 \times 10)^3} = 0.72\ in.$$

To the second split is a distance of 2100 ft., the air volume being 150,000 cu.ft., the water gage for this section is found in the same manner, and is 0.68 in. Likewise, to pass 100,00 cu.ft. of air to the third split, a distance of 2100 ft. again, will require a water gage of 0.30 in., and finally, to pass the remaining 50,000 cu.ft. the same distance to the last face headings will require a gage of 0.075 in. The sum of these four gages must then be doubled to provide for the return, in each case, which gives for the total water gage absorbed in the main headings $1.775 \times 2 = 3.55$ in.

It is well to estimate on a loss of at least 10 per cent. of the air, which means a loss in water gage of 19 per cent., which taken from 3.55 in. leaves only 2.87 in. water gage for 200,000 cu.ft. of air on the whole mine. to this point. The splits in the face headings show a water gage of only 0.075 in. for 2100 ft. with 12,500 cu.ft. of air.

All regulators on face headings should be placed near the main airway and must not be set beyond the first room heading, under any consideration. In reference to the percentage of water gage spoken of as being lost (19 per cent.), I have found in practice this loss reaches as high as 25 per cent., so that it is safe to call it 19 per cent., as 10 per cent. loss in air means 19 per cent. loss in gage. This is not all due to loss of air by leakage, but from air passing crosscuts and other wide places, which reduce the velocity.

At some of the mines there are three intakes and four returns, and it is about 1000 ft. to the first split. To pass 200,000 cu.ft. of air through three airways 6½x10

ft. for 1000 ft. will require 1.027 in. water gage. There are four return airways and the water gage on them will only be 0.57 in. for 1000 ft. long, making a total gage of 1.59 in., in and out.

The 2.87-in. water gage passing 200,000 cu.ft. of air will require just 90.4 hp. on the air, or a total of, say 150 hp. for the fan engine.

The mine fans in the Elkhorn field will be operated by a 150-hp. a.-c. motor, which should not have as much friction as a steam engine when working below capacity, for the reason that the motor will run at regular speed at all times; and, by having different sized pulleys for the motor, any speed needed for the mine fan can be obtained. Even should it have the same friction in fan wheel and motor, the 150-hp. motor will be large enough, until the water gage becomes higher, when a larger motor can be installed. The fan wheel will be 5x14 ft. and should give 200,000 cu.ft. of air at about 145 or 160 r.p.m. with this water gage, and the volumetric efficiency should be, at least, 180 per cent.

A boiler plant will be erected at each of the mines near the fan, for the purpose of adding steam to the air current when needed to humidify the mine air so that it will not be necessary to do any watering to dampen the coal dust in the mine.

I recall a mine at which had been installed a fan 7 ft. wide and 13½ ft. in diameter. This fan was delivering 116,000 cu.ft. of air at 112 r.p.m. and showed a water gage of 1.3 in. The fan was driven by a 125-hp. motor. It was stated that this fan was guaranteed to deliver 300,000 cu.ft. of air per minute, against a 6-in. water gage, at 300 r.p.m. At that time, the mine was new and the airways were not very long. Let us see what would have been the result if 300,000 cu.ft. of air had been desired while the airways were still short. The water gage will increase as the square of the velocity and the horsepower as the cube of the quantity of the air. For sake of illustration, I give below the water gage and horsepower for each 25,000 cu.ft. of air, increasing from 100,000 to 300,000 cu.ft. I use 100,000 cu.ft. as a base of beginning for simplicity. The fan delivers 116,000 cu.ft. of air, against a 1.3-in. water gage, which is equal to a 0.966-in. gage for 100,000 cu.ft. of air. Using the Fairley coefficient, as before ($k = 0.00000001$), we find as follows:

| Cu.Ft. of Air | Total Hp. | In. of W.G. |
|---|---|---|
| 100,000 | 21.5 | 0.966 |
| 125,000 | 42 | 1.5 |
| 150,000 | 72 | 2.17 |
| 175,000 | 114 | 2.95 |
| 200,000 | 171 | 3.86 |
| 225,000 | 224 | 4.89 |
| 250,000 | 336 | 6.04 |
| 275,000 | 446 | 7.30 |
| 300,000 | 575 | 8.69 |

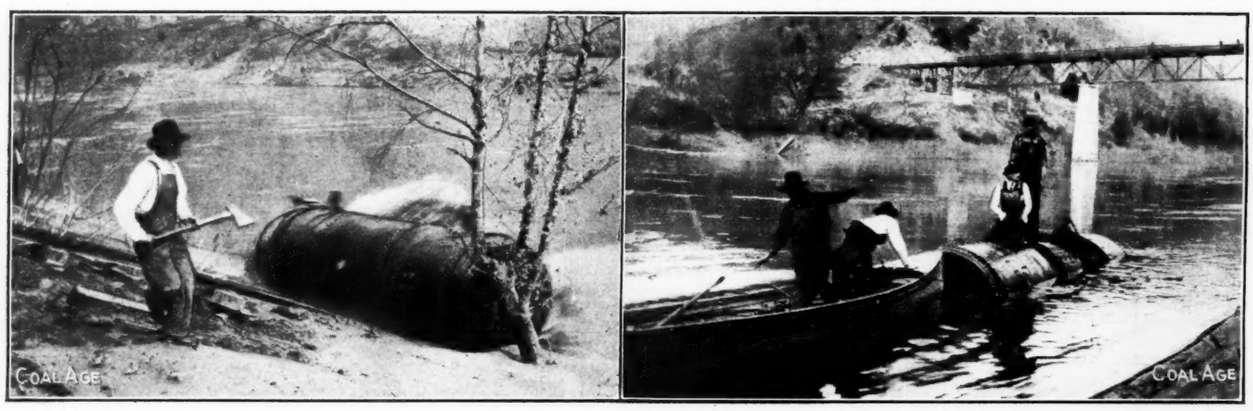
Allowance has been made for 71 per cent. of mechanical efficiency in the calculation of horsepower.

## Cross-Country Boiler Moving

By H. F. Pfening, Jr.*

In the month of April, 1914, the North East Coal Co., of Paintsville, Ky., purchased a new 150-kw., direct-current plant to be installed on Johns Creek, about 3½ miles from any railroad. Then came the problem of moving the boilers from the cars to the foundations. These boilers were 6 ft. in diameter, 18 ft. long and weighed 19,870 lb., or practically 10 tons each.

The first obstacle encountered was crossing and moving down the Big Sandy River for a quarter of a mile. This was accomplished by floating as may be seen in the illus-




Rolling One of the Boilers into the Water and Towing It across the River

Hauling a Boiler from River to Power Plant

*North East Coal Co., Paintsville, Ky.

tration. All the holes were plugged and when put into the river each boiler floated 16¼ in. out of water.

Each drum was towed to the mouth of John's Creek, by a motor boat, where it was then taken out of the water and up the bank a distance of about 100 ft. Here it was loaded onto a large wagon, which had 4-in. iron axles, 14-in. hubs and 5-in. tires.

It required 10 yoke of oxen or 20 cattle in all to convey this wagon and boiler to the power-house site, and even then blocks and lines were used in many places.

It required about 11 days to move these two boilers from the railroad cars at Auxier, Ky., to the No. 8 mine of the North East Coal Co., and cost about $500. This expense might have been reduced had there been a good road to travel over. As it was, however, a large portion of this amount was required to grade a road sufficient to carry such a load.

## Extracts from a Superintendent's Diary

One of the most trying duties that falls to my lot is the constant necessity of convincing the wives of my salaried employees that they are receiving all of the consideration guaranteed by their husband's position with the company. These wives rank about as follows, taking the salaries of their husbands as the criterion: company physician, mining engineer, commissary manager, mine foreman, master mechanic, electrician, chief clerk, etc.

Between the wives of this group of salaried men and the wives of the ordinary miners there is little fellowship, and for that reason little chance for misunderstandings, but between the wives of the different salaried men there is much intimacy and a corresponding (or to be exact, a more than corresponding) amount of jealousy and envy.

If the master mechanic finds a way to improve his bathing facilities the mining engineer's wife begins to grumble. If the electrician improvises an improvement in his house-lighting arrangement, the wife of the company physician comes to see me next day. If the mine foreman selects a car of coal for his own use that happens to contain more than the average amount of lump coal, the commissary manager's wife gets in her work on the company teamster, and so it goes.

Of course, any man with half a sense of humor could enjoy these petty manifestations of sisterly love if he were privileged to observe them as a rank outsider, but I am far from enjoying such disinterestedness. I have learned through bitter experience that whenever the wife of one of my employees becomes dissatisfied with her surroundings the husband will soon be requesting his time slip.

Just now I am trying to convince Mrs. Mining Engineer that Mrs. Company Physician was granted a telephone in her house because some of our employees who live at a distance demanded it.

For once I feel confident of victory; however, if Mrs. Commissary Manager had protested first the jig would have been up because she would have been ably seconded by the wives of all of the miners living on the outskirts who read with envy of the growing possibilities of trading by telephone, as related by our near-by city dailies.

We have established a sort of voluntarily accepted "Common law," the ladies and myself, which allows me to turn down all applicants for each particular favor after one applicant has been vanquished. They seem to realize that were I compelled to give each one of them a hearing on every claim that might arise, I wouldn't have time left for looking after their husbands. Despite their willingness to quarrel with me at every opportunity, they seem to prefer a continuation of my power rather than risk a successor in my position.

Speaking frankly, my sympathies are largely with these ladies. They have no permanent homes, and the joy of fixing things about the place that they may enjoy them in future years can never be more than a longing for them. And overlooking altogether my sympathies in the matter, I realize that every improvement for their homes which they succeed in securing, in spite of my well meant opposition, becomes another anchor tending to hold their family in its place in our community, counteracting occasional tempting offers from rival camps.

## Compressed-Air Locomotives at the Marihaye Coal Mines, Belgium*

At the coal mines of Marihaye it was decided to operate the subterranean haulage by means of compressed-air locomotives, and by the end of 1913 these had been installed at the Vieille-Marihaye pits.

The central air-compressing plant was erected above ground. In consists of two compressors of five stages each, belt driven by a 100-hp. electric motor. The number of revolutions is 190, and 10,500 cu.ft. of air are compressed per hour to about 3000 lb. pressure.

The air is cooled between each compressor stage, going through a separator to get rid of the oil and moisture. After leaving the compressor, it is cleaned and led into an air tank with four compartments of 16 cu.ft. each, from which pipes lead to the points where it is proposed to charge the locomotives.

The installation comprises about 13,000 ft. of 1⅛-in. (inside diameter) pipe of drawn steel, galvanized inside and out and provided with the usual high-pressure fittings. Each compressor can feed three locomotives in active service.

The locomotives carry a compressed-air tank composed of four flasks of drawn steel, about 13½ in. in diameter (inside) and 10 ft. long, arranged on the upper part of the chassis. The engine is of the triple-expansion type.

The locomotive carries two electric lights, one in front and one at the rear. Each machine can haul a train of 35 empty cars on a ½ per cent. grade at a speed of 100 ft. per minute, and return with the wagons loaded to the shaft, making the trip of 5000 ft. each way with a single charge of air. Each locomotive is about 12 ft. long, 31 in. wide, 55 in. high over all, and weighs about 10,000 lb.

One of the two compressors will take care of the haulage of 796 tons for one kilometer (3280 ft.) in eight hours with one locomotive. At present, one locomotive is at work on each of the two levels, having replaced six horses. It takes about half a minute to charge the air tanks. The use of these locomotives will soon be extended to the other pits of the company.

*Translated by Henry B. Binsse from a report by the Director in Chief of Mines at Liege, M. V. Leckat.

# The Battle of Ludlow

By L. C. Paddock*

*SYNOPSIS—A complete account of the action at Ludlow showing the battle was really an attack on the militia and not a defense of the tenters against military violence. The strikers killed one girl in bed; the women and children destroyed in the death pit were probably smothered before the tents were burned.*

The fighting at Ludlow lasted from early Monday morning, Apr. 20, until late Friday evening, Apr. 24, at which time General Chase arrived with reinforcements and a truce was declared. On Monday morning, a few minutes after 8 o'clock, a letter was presented at headquarters at Ludlow by a woman of foreign nationality, asking that her husband be gotten out of the tent colony. Many times previous to this various people had been taken out of the tent colony by troops stationed at or near Ludlow.

The Corporal, Patten, in charge of the train detail was sent to the Ludlow tent colony to get this man and was told that there was no such captive there. Returning he informed Major Hamrock of this, who then called Louie Tikas, the Greek, by phone asking him to come over to camp, which Louie refused to do.

### THE MILITIA GATHERS

As the people in the tent colony were gathered around in small groups in rather a suspicious manner, Lieutenant Lawrence, who was in command of the detachment stationed at Cedar Hill one and one-half miles southwest of Ludlow, was notified by telephone to come down a little earlier than usual for drill. Louie, the Greek, called up Major Hamrock stating that he would meet him at the depot, Major Hamrock accepting and going to that rendezvous.

Lieutenant Lawrence was again called on the phone by Hamrock who ordered him to bring the machine gun. Lieutenant Lawrence then left Cedar Hill in command of the advanced guard which consisted of ten men. Upon arriving near Ludlow he left these men on Water Tank Hill while he rode on to Ludlow depot to report to Major Hamrock.

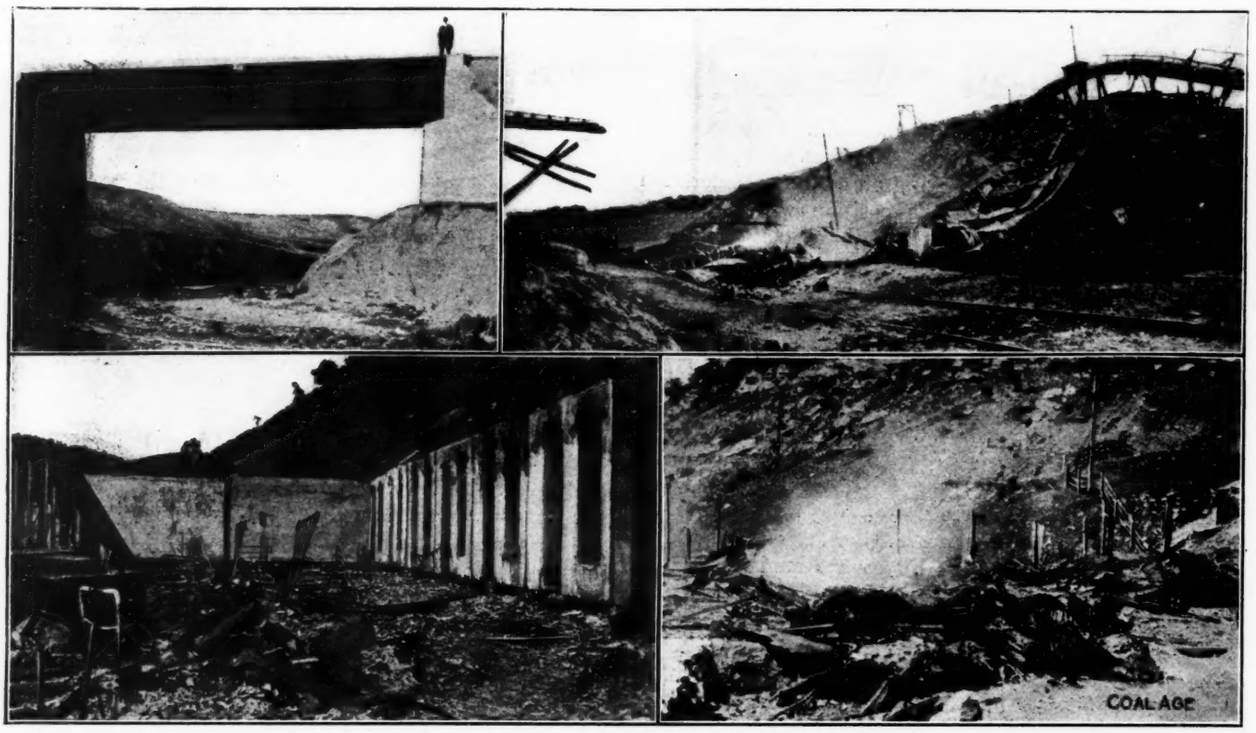
Lieutenant Lawrence called Major Hamrock's attention to the fact that groups of the strikers were armed with rifles and carried ammunition and were running back and forth, some of them having started for the cut on the Colorado & Southeastern, which is east of Ludlow. The main body of national guardsmen arrived from Cedar Hill under the command of Lieutenants K. E. Linderfelt and M. C. Bigelow and consisted of fifteen men.

### THE OPENING SHOTS FIRED BY COLONISTS

Louie Tikas left Major Hamrock, telling him that he would stop the strikers. Major Hamrock gave Lieutenant Lawrence orders to take up a position on Water Tank Hill and immediately upon returning to the hill from the depot Lieutenant Bigelow was sent with seven men to take up a position south of the Colorado & Southeastern R. R. cut, Lieutenant K. E. Linderfelt returning upon Water Tank Hill proper and Lieutenant Lawrence swinging over to the right of the Denver & Rio Grande tracks with five men.

The strikers, about three hundred in number, having gained the cover of the cut on the Colorado & Southeastern, opened fire on the detachments under Lieutenants Lawrence and Bigelow. Immediately afterwards another large group of strikers which had gone north and northwest from the tent colony toward the arroyo and the steel bridge, opened fire on the military camp at Ludlow which was southwest of the tent colony.

Before the firing started a large group of women and children, numbering about four hundred, left their homes running northwest to the arroyo. There were about thirty shots fired at the detachments of the National Guard south and southeast of the cut on the Colorado & Southeastern under Lieutenants Bigelow and Lawrence, before the order was given to commence firing. General Chase had been called on the long distance telephone by Lieutenant Benedict, Major Hamrock's adjutant, from the military headquarters at Ludlow, notifying the general that firing had started.




View of the Iron Bridge near the Ludlow Tent Colony and Three Views of Destruction Wrought by Strikers

*Editor the "Daily Camera," Boulder, Colo.

Note—This article appeared in the "Daily Camera" and we are indebted to the same paper for the photographs from which these illustrations are prepared.

Major Hamrock, after returning from the depot to the military camp at Ludlow, took up a position near cars south of this camp on the Colorado & Southeastern, from which point he could see very well the positions being taken by his own men.

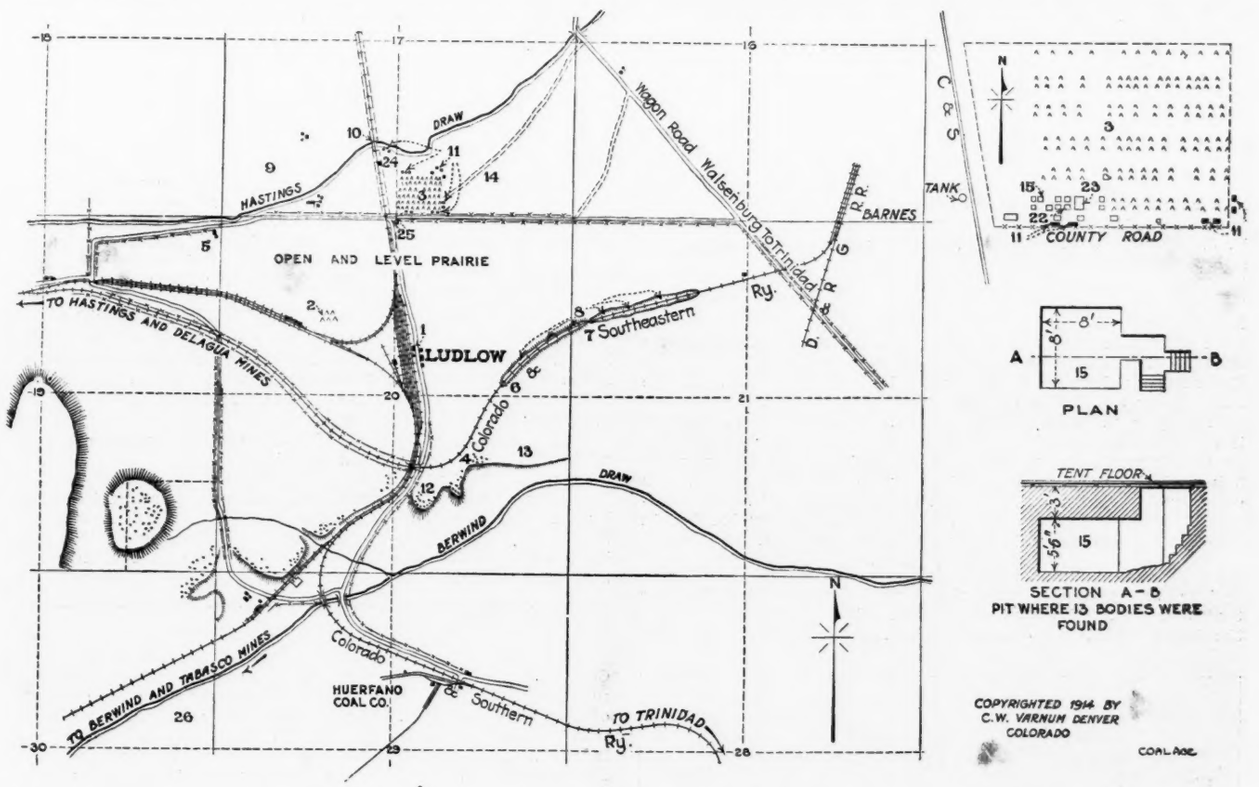
### NO PROFESSIONAL MINE GUARDS

Soon after firing started, three bombs which had been provided to use in calling assistance, were set off and Lieutenant Benedict was sent by Hastings cañon to the west to take charge of the men who would come to the Guard's assistance from that point, belonging to Troop A. None of the 18 men who came out of Hastings cañon, members of Troop A, were employed as mine guards but were employes at the mine, one a doctor and several being mechanics and miners.

On the right of the line a member of Lieutenant Lawrence's command, Private Martin, received a wound in the neck. Lieutenant Lawrence was forced back from his position on the extreme right, being forced to withdraw without the body of the wounded Martin, whom he left in a small draw. As Lieutenant Lawrence had been forced back on the extreme right the strikers had been able to deliver a cross-fire on Lieutenant Bigelow, whose position was south of the Colorado & Southeastern cut, forcing Lieutenant Bigelow to retire from that point. Retiring, Lieutenant Bigelow swung around to the right, meeting Lieutenant Lawrence and received orders to take up a position upon a knoll which was less than 150 yd. west of another point occupied by the strikers and to do what he could to recover the wounded Martin, who lay in a draw between these two points. Lieutenant Lawrence retiring and taking up a position 600 yd. to the rear, covering the position held by Lieutenant Bigelow.

As Lieutenant Bigelow had but five men with him at this point and was greatly outnumbered by the strikers east of him and those along the Denver and Rio Grande tracks, he was forced to retire from his position on the small knoll after having had one of the members of his command, Private Purcell, wounded, Private Purcell being hit by a soft nosed bullet in the left arm a little over two inches below the shoulder, which coming in contact with a bone, part of it lodged in the chest, and part in his back.

After Lieutenant Lawrence had returned to Water Tank Hill, Lieutenant K. E. Linderfelt forced his way down to the Ludlow depot, taking up a position at that point, having three or four men with him and delivering a fire into the west end of the cut of the Colorado & Southeastern. Major Hamrock not being able to get General Chase on the long distance telephone from military headquarters, as the line had been cut, succeeded in getting General Chase shortly after one o'clock at the office of the Cedar Hill Coal & Coke Co. near Ramey. He was notified by General Chase that reinforcements would come out during the afternoon from Trinidad with more ammunition. Captain T. C. Linderfelt and Lieutenant R. J. Linderfelt, having arrived about noon, were left in command at the Ludlow station by Lieutenant K. E. Linderfelt who returned to Water Tank Hill, Lieutenant Bigelow being sent to work with Captain T. C. Linderfelt by orders of Major Hamrock.




PLAN OF THE BATTLEFIELD OF LUDLOW

The numbers of men given here at first seem grimly humorous as describing an "army" and as designating one party in a "battle." When we think, however, of the greater number of adversaries and realize how the size and power of the smaller force has been misrepresented, the recital of the men engaged appears pathetic rather than humorous. The figures on the map are as follows: (1) Ludlow Station. (2) Major Hamrock with the army center (four men). (3) Ludlow tent colony. (4) Water Tank Hill, Lieutenant Lawrence with 22 men and a machine gun until 3:30 p.m., when Captain Carson arrived with another machine gun and 46 men. (5) Lieutenant Benedict with left wing of eight men. (6) and (7) Machine guns after about 4 p.m. (8) About 250 or 300 Greeks, etc., 9 a.m. until about 4 p.m. (9) Private Phillips mortally wounded. (10) Steel bridge. (11) Strikers to the number of 250 to 400 in rifle pits, some of which were of the latest and best military types. (12) Captain Carson with machine gun and 46 men arrived here at 3:30 p.m. (13) Private Martin wounded about 10 a.m. Body recovered about 10 p.m. (14) John Lawson, strike leader, in automobile about 11 a.m. (15) So called "death pit," which is reproduced in plan and elevation in lower right-hand corner (22) Tent marked "Lawson's Headquarters." Over 19,000 rounds of ammunition in boxes were found here, and among them about 400 Ely's explosive elephant cartridges. (23) Union headquarters. (24) Tikas, Rubino and Tyler captured. (25) Same men killed. (26) Cedar Hill. (16) to (21) and (28) to (30) are section centers.

### FIRE FROM TENT COLONY

Several times during the afternoon small details under the command of Captain T. C. Linderfelt, aided by Lieutenants R. J. Linderfelt and Bigelow, were able to push their way through to the north end of the string of box cars and freight cars standing in the yards west of the depot, but were unable to go any further because of the fire they received from the rifle pits on the south side of the tent colony, the tent colony and those northwest of the tent colony in the direction of the pump house and the steel bridge.

### MUTILATION OF MARTIN

Captain Carson arrived from Trinidad with about thirty-six men with ammunition and a second machine gun, which was in use during the fight. Captain Carson detrained at Rameyville and immediately advanced to the aid of Lieutenant Lawrence on Water Tank Hill. After Captain Carson's arrival several attempts were made by Lieutenant Lawrence to recover Martin's body but with no success. Not until 9 p. m. was he able to reach it. He found Martin's body terribly mutilated. Not only had he received a wound passing through his neck but he had been shot directly from above as he lay on the ground. This shot passed through his mouth tearing out two teeth and blowing off the top of his head. Not only that but his face had been caved in by a blow with the butt end of a rifle, his nose being broken and blood oozing from both ears. He had also been shot twice through the body at the waist.

The strikers holding a position in the cut on the Colorado & Southeastern were forced out of this position in the direction of Barnes on the Denver & Rio Grande about 5 o'clock in the afternoon.

### THE BATTLE SHIFTS TOWARD THE TENTED TOWN

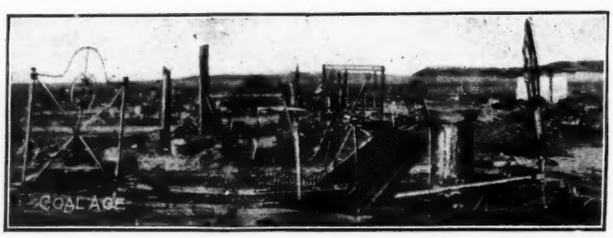
About the same time orders were given to Captain T. C. Linderfelt and the officers with him at the Ludlow depot to aid in the taking of the steel bridge over the arroyo, northwest of the tent colony, as Lieutenant Benedict had been able to force his way from the west and occupied a position in a couple of ranch houses about 400 yd. west of the bridge.

Captain T. C. Linderfelt with Lieutenants Bigelow and R. J. Linderfelt with 10 men, taking advantage of the cover afforded by the Colorado & Rio Grande tracks, had been able to take up a position just south of the road going west to Hastings, about seventy to eighty yards southwest of the tent colony. About this time Captain Carson arrived with a support and took up a position on the right of Captain Linderfelt. During this time they received a hot fire from the strikers located in the pits in the southwest of the tent colony and those in the tent colony proper.

The two machine guns which had been placed, one on the east side of Water Tank Hill and the other at the cut on the Colorado & Southeastern which had been taken, were firing at the steel bridge and the rifle pits along the south bank of the arroyo. The troops, under Captains T. C. Linderfelt and Carson, returned the fire of the strikers located in the pits along the south bank of the tent colony.

### THE TENTS CATCH FIRE

The volley fell among the tents. It was at this time that a tent in the southwest part of the colony took fire the blaze shooting up through the roof. At that time there




LUDLOW TENT COLONY AFTER CONFLAGRATION

were no troops east of the Colorado & Southern tracks. Several of the men were able to get across the Hastings road underneath the water tank. Throughout the night there were constant explosions of ammunition, giant powder and dynamite in the tent colony. The fire was also aided by a strong wind from the southwest.

After the sixth or seventh tent was afire, the cries of women and children were heard from the tent colony. This was the first intimation the troops had had during the day that there were any women and children left in the colony. A great number of women and children had been seen leaving the Village before the firing opened about 9 o'clock in the morning. The order was immediately given to cease firing and all ran into the tent colony to rescue women and children left there by the strikers.

### THE AIR-TIGHT PITS

During the time that the rescue work was going on the troops engaged in this work were constantly under the fire from the strikers situated to the north of the tent colony and to the northwest toward the steel bridge. These rescuers made excellent targets in the glare of the fire. Various obstacles were encountered by the men and officers engaged in the rescue work in order to get the women and children out of the pits in which they had been placed. At one pit where Lieutenant Bigelow rescued a woman and children, two trunks and a carpet had to be removed and a trap door opened in order to get into the pit where the women and children were. Similar boards were found over the pits by others engaged in the same work. The troops about this time started running for the cover offered by the Colorado & Southern R. R. tracks, taking the women and children, because they were told that a large quantity of dynamite was in one of the tents which was at the time on fire. They had no sooner reached cover when this tent went skyward, spreading sparks all over the colony. Many of the soldiers again returned into the tent colony to go on with the work of rescuing the women and children.

### THE WHITE FLAG

At this time a buggy drove out of the southeast corner of the colony, driving west on the Hastings road. The occupants of this buggy carried a white flag and upon crossing through the line one of the occupants turned around and opened fire on the troops. The fire was returned with the result that one of the occupants and the horse were shot. A Colorado & Southern freight train coming in from the north and slowing up to take water at the tank allowed the strikers in the pits north of the colony and those near the pump house to get away to the arroyo.

Lieutenant Benedict, who had held a position in the ranch houses west of the steel bridge during the afternoon, sent the men under him back to Hastings after the tent colony caught fire, as they did not have uniforms on and he did not want them to mix with the men in uniform. They took two men who had been wounded during the afternoon.

### ONE MINE GUARD AND A STRIKER KILLED

One of these men, Phillips by name, died a week later in the Pueblo hospital from his wound received that afternoon. Captain Linderfelt, who returned to the water tank from the steel bridge, was sent back to hold the steel bridge by order of Major Hamrock.

Captain Linderfelt left Lieutenant Connor, who arrived with Captain Carson from Trinidad during the afternoon, with a couple of men at the pump house. At the steel bridge the body of a striker was found. This striker had been shot by a steel jacketed bullet making a clean wound through the head. The steel jacket bullet is a service ammunition used by the armed forces of the United States and the only kind authorized by modern warfare.

### DEATH OF LOUIE TIKAS WHILE ATTEMPTING TO ESCAPE

Shortly after this Louie Tikas was captured by Lieutenant Connor at the pump house, and Filer and Rubino were made prisoners at the steel bridge by the detail under the command of Captain Linderfelt. The latter leaving Lieutenant Bigelow in command at the steel bridge went to the water tank himself. Lieutenant K. E. Linderfelt, after the capture of the three men, went to the Ludlow depot to notify Major Hamrock. After he left the men in charge of the prisoners they were fired on from the strikers on the east side of the tent colony, the men immediately taking to cover. The prisoners, taking advantage of this, tried to escape, with the result that they were shot.

Major Hamrock placed his outposts about midnight and later summoned the officers to a meeting at Cedar Hill to discuss the plans for the ensuing day, Lieutenants Bigelow and Connor being left in command at Ludlow during this meeting.

### BOTH SIDES REINFORCED

Early in the afternoon, during the fight on the 20th, Major Hamrock received word of about 250 strikers coming from Aguilar, Rugby and Rouse to reinforce those at Ludlow. He notified the people at Delagua and Hastings to get out into the hills and to watch the trails from Aguilar.

A group of negroes working at Hastings, about twenty to twenty-five in number, led by a negro who had been a first sergeant in the 24th U. S. Infantry, had taken up a position in the hills two and one-half miles west of Ludlow. Hamrock also notified the people in Berwind cañon to get into the hills and look out for strikers who were coming from Segundo toward Tollerberg. At about midnight he received word of a large number of strikers, about 300 in number, coming from Trinidad.

The troops were reinforced early Tuesday morning by Company C, Second Infantry, from Lamar, and by a small detachment of troops from Walsenburg. These, with the reinforcements received during the afternoon of the 20th, brought the original number of 44 troops at Ludlow up to 168 and 19 officers. Major Hamrock received a call for aid

from Hastings, sending a small detachment there, the strikers retiring as soon as the detachment arrived.

STRIKERS SHOOT FOUR MEN AND ONE GIRL

The next day a similar call for help was received from Delagua and again as soon as the troops arrived the strikers retired back over the hills in the direction of Aguilar, after having killed four men and shot a 14-yr-old girl while still in bed at Delagua, and shooting all the livestock and various domestic animals at the ranches in the neighborhood. These same strikers later burned up the cañons around Aguilar.

THE DEATH PIT

Tuesday morning, the 21st, a pit was discovered under what had been one of the tents in the colony and containing the bodies of 2 women and 11 children. Lieutenant Benedict and Dr. Lamme of the medical corps immediately went to investigate, finding that none of the bodies showed any evidence whatever of bullet wounds and that the victims had been suffocated and had been dead some time prior to the time the fire started in the colony.

A number of eminent physicians, after having seen the pit where these 2 women and 11 children were found, stated that 13 people could not live more than two hours in that pit without being asphyxiated. It was 7x8x5 ft.

DUMDUM AND EXPLOSIVE BULLETS

During the time of the rescue work in the tent colony a large quantity of ammunition was taken from the tents, some 19,000 rounds being taken from one marked "HEADQUARTERS JOHN R. LAWSON." There were 11 cases containing 1,000 rounds each from which the seals had not even been broken and 500 rounds of 45.70 dumdums. There were 200 rounds of Ely Express, calibre 45.100, a soft nose bullet containing an explosive cap in the end. Upon coming in contact with a human body the head would immediately explode and spread the lead.

All the ammunition taken from the tent colony was soft-nose ammunition. Bullets of this character are not used by the forces of any civilized country at the present time. The troops at Ludlow were surrounded by about 1200 strikers when General Chase arrived on Friday afternoon, April 24.

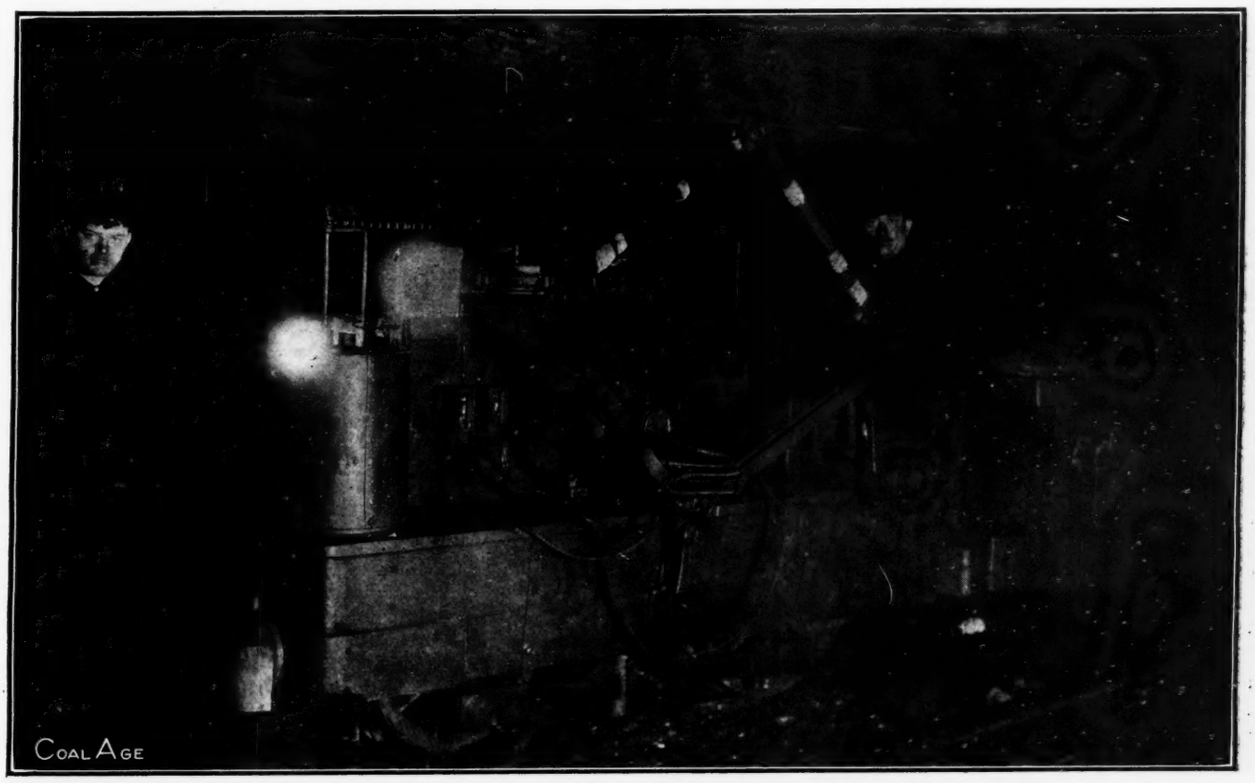
The number of substances which are used for electric conductors in commercial work is limited to three of the metals, namely, copper, iron and aluminum. Of these, the first is preëminently the best, while aluminum and iron come next in order.

# An Historical Mining Locomotive

By H. C. Spaulding*

*SYNOPSIS—The second electrical mining locomotive installed in the anthracite region was of Thomson-Houston manufacture, and has been in operation since 1889 and is still running.*

Through the courtesy of The Society for Electrical Development, we publish herewith an illustration showing a mining locomotive which is not only interesting from an historical standpoint, but unique in its record for long and continuous service. This machine was installed at the Hillside Colliery, in 1889, and is still in satisfactory service. It was the second to be put in operation in hard-coal mining, the first having been built a year or two before for the Lykens Valley Coal Co., of Lykens Valley, Penn., by the Union Electric Co., of which W. S. Schlesinger was chief engineer.




The Second Electric Locomotive to Be Installed in the Anthracite Region

The locomotive shown in the illustration was the first to be built by the Thomson-Houston Electric Co., at Lynn, Mass., and was designed largely by C. J. Van Depoele, who was at that time actively engaged in the development of various types of mining machinery, including coal-cutting machines, reciprocating drills, pumping apparatus, etc. The adoption of electric haulage in place of mules was due to the farsightedness and enterprise of Capt. W. A. May, then superintendent of the Hillside Colliery, and now general manager of the Pennsylvania Coal Co.'s properties.

This machine was rated at 40 hp., had a 3-ft. gage, and

*Society for Electrical Development, 29 W. 39th St., New York.

was 9 ft. 7 in. long and 5 ft. 3 in. wide over all, with a height of 5 ft. 6 in. above the rails. As originally built, it weighed 10,500 lb., but 18,000 lb. of pig iron was added later as a dead-load to increase capacity for drawbar pull.

The above-ground installation consisted of a 60-hp. Armington-Sims engine belted to a 2-pole "50-hp." Thomson-Houston generator of the type made familiar by the Siemens & Halske Co. in Germany. Connection from the switchboard to trolley wires was made by No. 0 "Clark" wires inclosed in gas pipes, as a safeguard against mechanical injury. This fact is noticeable in view of the practice generally adopted later for pipe-inclosed wiring.

In the Lykens Valley installation worn out rails were used for the trolley contact, being joined end to end by copper bonds, but in the Hillside Colliery the trolley was a continuous No. 0 hard-drawn copper wire supported by insulators which later became generally known as the mining or "barn" type, fastened to the roof of the gallery by expansion bolts.

The electrified part of the track ran for about ½ mile in either direction from the foot of the shaft. It is interesting to note that previous to the electrical installation the galleries were dripping wet all the time owing to the condensed "steam" from the mules, and that after these animals were replaced by the electric locomotive this feature entirely disappeared.

In the construction of the locomotive itself, a single double-pole motor was used, the power being transmitted from pinions on the armature shaft through idlers to the driving shaft, which by the ordinary block and slot construction actuated the rods on either side connecting the two pairs of wheels. The crankpins were placed at 90 deg. from each other to avoid dead points. This construction allowed sufficient flexibility for inequalities of the track and movement of the motor with reference to the wheels.

As will be noticed from the illustration, the trolley was of the "lazy tongs" type, upward pressure against the wire being secured by the tension of spiral springs tending to "close up" the lower members.

It is interesting to note that the first electrically operated pump to be installed in the hard-coal country had been put in operation in the near vicinity only a short time before, and that this pioneer locomotive was followed not long afterward by one of 60 hp. of the "turtleback" type, since generally adopted for this class of work.

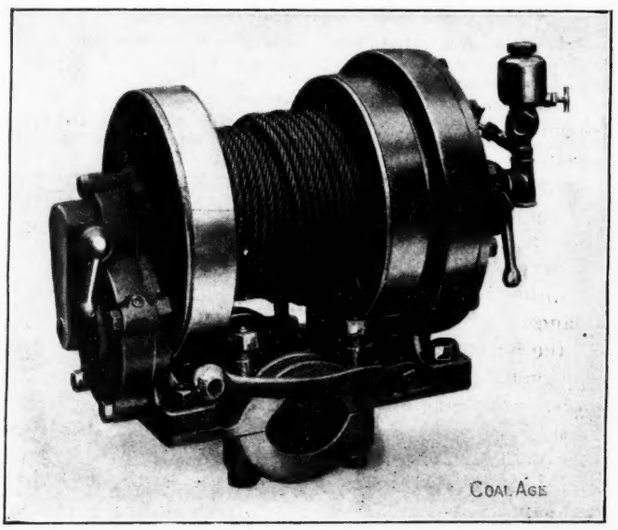
## The "Little Tugger" Hoist

A new type of hoist has recently been placed upon the market by the Ingersoll-Rand Co., 11 Broadway, New York City. It is intended for light lifting, having a capacity up to one-half ton and, due to its small weight, which is under 300 lb. complete, it is particularly suitable for use as a portable hoist for mines, in contract work, for manufacturing plants, power houses and in railroad shops and ship yards.

Miners are using it in winzes, stopes and raises, for raising and lowering drilling machines, mountings, drill steel, timbers and miscellaneous material, for hauling cars in drifts and tunnels and for hoisting and lowering buckets in shallow shafts, and for other similar purposes.

The main base of the hoist is arranged so that it can be bolted to a timber or by means of a cap which comes with the hoist it can be clamped to a circular member, such as a mine column or arm, shaft bar or pipe. The dimensions of the hoist are 21¼x16½ in., and the height is 20⅛ in. The drum is 6 in. in diameter with a space of 7 in. between flanges. This will accommodate a length of 700 ft. of ¼-in. rope or 450 ft. of $\frac{5}{16}$-in. rope. The capacity is 1000 lb. with a rope speed of 85 ft. per min. at an air pressure of 80 lb. The machine operates with either compressed air or steam.

The motor or engine is of the reversible square-piston type, giving four impulses per revolution. There are no




REAR VIEW OF THE HOIST, SHOWING THE THREE CONTROL LEVERS

dead-centers and the machine will start in any position. The drum is mounted independent of the engine shaft and is operated through the medium of a clutch and gears. Safety is provided for by a powerful worm-operated band brake lined with "Raybestos."

The speed of hoisting is entirely at the will of the operator. When he releases the throttle, it returns automatically to central position, shutting off the power and stopping the hoist. Oftentimes the hoist will be used for haulage purposes and the release feature enables one man to handle this class of work. He can leave the control lever and carry the rope to the car.

There are no moving parts exposed, except the drum, all gears and shafts being covered. This is an especially desirable feature for underground operation where the light is none too good and where there is constant danger of workmen's clothes or bodies getting caught in the machinery.

So far as the practical electrical worker or engineer is concerned, electricity may be considered as one of the various forms of energy. Being such, it is never created, but is always produced at the expense of an equal or greater amount of energy in some other form. Electricity serves no useful purpose as such. It must be converted into some useful form of energy, such as mechanical, chemical or thermal, before it can be utilized. Electrical energy must always be used when it is produced, and produced when needed, for it cannot be stored. Because of the ease in transforming it into other useful forms of energy and transmitting it over great distances, electricity is being used more and more for commercial purposes. The ultimate nature of electricity is unknown. Recent discoveries would indicate that matter itself is composed of ultimate particles or charges of electricity.

# Economy of Varying the Speed of Mine-Ventilating Fans

By a West Virginia Coal Mining Engineer

*SYNOPSIS—In many mines it is found practicable to operate the ventilating equipment at one speed during working hours and at another during the night or on idle days. The two-speed induction motor is admirably adapted to such conditions.*

The art of ventilating coal mines mechanically, dates back to the early days of the steam engine; the practice of economical ventilation is of comparatively recent birth.

Economy is becoming a much used word. It behooves us to know what it means according to the dictionary and to apply the principle to each of the different branches of our business if we are to keep up with the march of progress.

In mining coal, the cost of maintaining ventilation in accordance with the mine laws of the different states is one of the heaviest expenses encountered after operations have extended over a period of six or seven years. As time advances and the mine grows larger these expenses increase. If ventilating charges represent a large proportion of the total cost of work underground, any economies successfully brought to bear will have an effect in reducing the cost of production.

In considering a ventilating proposition, we have many factors to cover. Few words are required to describe this operation in an ordinary mine. The air is pulled through the galleries or tunnels of the underground workings by a centrifugal, or other fan, placed outside near the source of some certain power supply. It is very simple to describe. To do the work with a reasonable economy in power is not so simple.

It is desirable to comply with the mining regulations as far as possible, and deliver all the fresh ingoing air to the face of the actual working places. These points, from the nature of things, are furthest inside the mine and the most distant from the ventilating fan. Dozens of stoppings, overcasts, doors, etc., may be required to control the air current and carry it to where it is needed. If these stoppings could be built completely air-tight, an efficient ventilating layout would result. We are only poor weak mortals after all, and our efforts to build perfect structures in the darkness of a coal mine—or anywhere else—are not always crowned with success.

The longer a tunnel or airway is, the greater the number of stoppings there may be connected with it; and the greater may be the air lost through leakage. Again, if the pressure on one side of a stopping is decidedly greater than it is on the other, a proportionately greater amount of leakage will occur.

These losses are cumulative, and there are conditions where all the air is lost through stoppings, etc., before it reaches the face of the workings where it is needed. To repair the structure or stoppings in such a case requires time and labor and material. How much can be economically spent?

Airways of too little area require current at a high velocity in order to pass the volume required for thorough ventilation. By clearing out obstructions, and widening or multiplying the airways, the velocity is reduced and power saved. How much can be economically spent for such a purpose?

## Conditions Change Rapidly

These questions are capable of solution only for short periods. Conditions change from week to week. As the workings extend underground, the amount of air required is increased, the resistance runs up, the number of stoppings multiply, the current of air may be lengthened or shortened. All of these things take place, resulting in a change in the amount of work required of the fan. If, by making repairs, extensions and changes, costing, for example, $100, the fan is relieved of 10 per cent. of its work, we have something to show on both sides of the account, and can decide whether or not the money has been well spent, if we know the amount of power saved and its cost per unit.

There are few cases where the cost of power per horsepower-hour is known in installations where a steam engine is used for driving the fan. The practice usually is to operate at a certain number of revolutions per minute, this speed being maintained by opening and closing the throttle valve. This critical speed is governed by the needs of the mine. If there is "bad air" on "Third Right," the foreman may "speed 'er up" a few revolutions. Or, again, the drivers are "not able to keep a light," in another part of the mine. In this case the fan may be "slowed down a little."

Under such conditions, and they exist more generally than one would imagine, the cost of power used cannot always be figured accurately. In many instances it is not known at all. The mine, however, may be amply ventilated at some one of the different speeds at which the fan is run. This particular speed, whatever it is, is the proper one at which the fan should be driven during the time when the underground operations are in full activity.

Where a mine is equipped with a fan of ample capacity, and has airways as well as underground structures in fair condition, a certain number of revolutions of the fan will furnish a sufficient amount of air to comply with the mining law and to fully ventilate the mine when it is producing its maximum tonnage. Such ventilation will require the maximum horsepower applied to the shaft of the fan.

During the hours when the mine is not producing coal, say at night, on Sundays and on holidays, only a fraction of this ventilation is needed. In mines where no inflammable gas is found, tests have shown that at night and on idle days, about half the full ventilating current is sufficient for all needs and all the demands for safety.

Under conditions such as we have outlined, a steam-driven fan can be slowed down to, say, half the speed used in the daytime, and the volume of air will be reduced in almost the same proportion. The steam, however, will vary in pressure, and this, too, will further vary the speed of the fan as well as the volume of air passing.

An engine running under such conditions is extremely inefficient, for the reason that the horsepower delivered to the shaft of the fan at half speed is practically one-fifth that delivered at the full speed, according to numerous recent tests. Where electric power is available, we should be safe in recommending its use for a drive, if for no other reason than to obtain a contant speed of rotation.

### High Night Fan Speed Is Useless

In nongaseous mines, or others, where at night, etc., there is required only half the ventilation that is used in the daytime, it is needless expense to use more. Those officials who are responsible for the safety of life and property, after due and careful consideration of all the conditions, should be able to decide as to what amount of air may be used at night, etc.

Having properly decided that full speed and half speeds are safe for the operation of a particular mine fan, any other speed is not only unnecessary but wasteful in power. In other words, if half speed will fully meet the requirements in the way of ventilation, it is unnecessary to go to the expense of furnishing other ratios.

If a speed-regulating device were supplied as in the case of a steam engine, for example, the control of the power consumption, and therefore to a certain degree the cost of ventilation, would be in the hands of a comparatively irresponsible attendant who cannot be depended on to do one thing the same way every time. A motor capable of running at full speed, whatever that may be, and at half speed, fills the requirements of fan drive fully.

Once it is installed it assumes all responsibility as to the speed of the ventilating apparatus. It operates at either one or the other of its two possible speeds, and the fan, as a result, is either handling its full prescribed capacity or approximately half of it.

Occasions arise which demand that the maximum rotation of the fan be changed, either increased or decreased. Such changes can be well and cheaply made by substituting a different diameter of pulley on the motor shaft, when a belted installation is being considered.

The power saved by making the high-speed rotation exactly what is needed to fully ventilate the mine, and no more, when underground conditions are reasonably good, soon amounts to enough to pay for an extra or different driving pulley, or even several of them.

# A Bibliography on the Export Trade

By F. R. Wadleigh*

*SYNOPSIS—Although a few American companies have conducted exhaustive investigations into the export trade, the general knowledge on the subject is limited. Recent urgent requests for information along this line have made it seem advisable to publish a bibliography of the available data. As pointed out by the author, it would be difficult for one man to compile a list that would cover the subject in all its ramifications, and readers are invited to contribute additional or supplemental notes.*

Interest in the exportation of coal is quite pronounced at this time, as is shown by the numerous inquiries regarding possible markets, competitive coals and prices, credits, freight rates and ship tonnage.

The subject is such a large one, comprising, as it does, every phase of coal handling from mining and geology to the actual burning of the coal, together with economic and political questions of the greatest importance, that a book of good size could readily be written on it. I have seen one private report, covering export possibilities to but one set of markets, that comprised 392 pages of typewritten matter. New conditions that have arisen as a result of the war now going on make the export question a matter of present and vital importance, and a knowledge of its ramifications and conditions absolutely necessary to those interested. To assist in obtaining such knowledge, I have made up a list of books, articles and public reports that have a bearing on the subject; in short, a bibliography of the coal export trade, incomplete probably, but none the less of some value. I would suggest that the readers of the Coal Age add to this list by advising the editors of any articles that may have been omitted.

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### Foreign Journals

As England leads the world by a wide margin in the export of coal, it is natural that most of the data on the subject should be found in English publications. The two leading English coal papers, the *Colliery Guardian* and the *Iron and Coal Trades Review*, publish each week, letters from all of the English shipping ports, giving prices, foreign contracts and inquiries; they also give numerous items regarding coals and the coal trade in foreign countries.

The *Liverpool Journal of Commerce* (daily), probably the leading shipping paper of the world, devotes two whole pages of its Friday issue each week to coal and the foreign trade.

The *Cardiff Journal of Commerce*, controlled by Mr. D. A. Thomas, one of the world's greatest authorities on coal export, also devotes considerable space to the subject.

*La Revue Noire,* published at Lille, France, the leading French coal paper, also has regular reports from the various foreign coal markets, statistics, etc.

Neither the British nor our own government has published anything on the subject, with the exception of consular reports. The United States Government has, it is true, published two reports on the world's coal trade, but these are made up from consular reports, many of which are inaccurate and do not give the information desired and needed. I recently suggested to our government officials the advisability and value of getting together and printing a full and accurate report on the coal trade of South America, made from the standpoint of the coal sellers in this country, and giving the information they would like to have; this suggestion has not met with much favor, although it was admitted that such a publication would be useful and timely.

## Bibliography of Books

***The Coal Question;*** W. S. Jevons; London; 1st Edition, 1865; 3d Edition, revised, 1906.

An inquiry concerning the progress of the nation and the probable exhaustion of the coal supplies. It is the standard book on the subject, dealing with it from an economic standpoint, entirely on the British side. Geology, costs, prices, economics, consumption, exports and imports, changes and progress of the coal industry and coal resources of various countries are among the topics dealt with. It is a most interesting book to anyone in the coal trade, with copious and valuable references.

*The Coal Fields of Great Britain;* Edward Hull; London; 5th Edition, 1905.

As its title implies, this work is devoted to the coal fields of Great Britain, their geology and extent. It also has valuable data on the world's coal fields, with some analyses, chapters on coal exports and duration of the coal supply.

*Analyses of British Coals and Coke;* Allan Greenwell; London; 3d Edition, 1909.

This is a compilation by the editor of the *Colliery Guardian,* giving analyses of British coals and coke, with map, description of the different coal beds, names of collieries and trade names of coals. It contains the only collection of analyses from all the British fields, but too much reliance must not be placed on these, as some are too old to be of value (1860), and the majority are of mine samples, probably selected. For instance, analysis of Cambrian Navigation (Admiralty) coal shows 0.62 per cent. ash, while a sample from an actual shipment of the coal from another source showed 3.46 per cent.

In comparing them with analyses and calorimeter tests of our coals, it should be remembered that in a majority of cases the results are stated in different terms from ours. Most of the tests were made with the Thompson calorimeter, which may give 300 to 500 B.t.u. lower results than would the bomb calirometer.

The introduction of this book contains valuable information on purchase, storage, calorific values and the meaning of coal analysis, the last named being especially good.

*Hints to Coal Buyers;* Charles E. Evans; Cardiff, 1909.

This contains maps and descriptions of the South Wales coals, coal docks, preparation, analysis, briquettes, notes on sales, including charter parties, and much other information on Welsh coals. Also, a supplement to the plotted vertical section of the Northumberland and Durham coal field. (John Kirsopp, Jr.)

*New Castle,* 1908.

Description and analysis of coals from this field, including names of collieries and seams, together with characteristics of the various coals. This is the only work of the kind on this field. There are several hundred analyses, collected from various sources, the authority being always given.

*1905 Royal Commission on Coal Supplies;* in three volumes; London, 1905.

A digest of the evidence, reprinted by the *Colliery Guardian* and revised by witnesses. This is a compendium of information on the British coal trade; it includes mining, selling, buying, use and exports. Some interesting statements are made on the competition of United States coals. It also contains quite a complete bibliography on coal mining, both foreign and English. Volume 3 consists entirely of evidence regarding the export trade. Volume 2 has a bibliography of works in coke, briquette making, spontaneous combustion, fuel economy, gas making and liquid fuel.

*Coal;* James Tonge; New York, 1907.

This is written entirely from the British standpoint. It describes foreign coal fields with analysis and values and gives a list of world's coaling stations.

*Story of American Coals;* W. J. Nicholds; New York, 1904.

This deals only with United States coals; it does not contain much information as to markets, but the export question is mentioned on pages 55 and 139, where reference is made to our competition with English coals and why we cannot compete in the world's markets.

*Modern Practice in Fuel Contracts;* Myles Brown; Wigan, England, 1911.

This gives a number of foreign coal-contract forms and specifications; also analysis of foreign coals.

*Shipping and Freight Business Prospects;* Year Book; Business Statistics Co., Ltd.; Cardiff.

This is a small annual publication reviewing the past years in the coal and shipping trades and the prospects for the coming year. Statistics on export coal, prices and freights.

*South Wales Coal Annual;* Business Statistics Co., Ltd.; Cardiff.

An annual publication devoted to the South Wales coal trade. It contains valuable and useful data on exports and coals generally.

*North Country Coal Annual;* Business Statistics Co., Ltd.; Cardiff.

An annual publication devoted to the Northumberland and Durham coal trades, with statistics and data on exports and output.

*Buying and Handling of Steam Coal;* Boston Chamber of Commerce, 1909.

This is compiled and written with special reference to coals for New England, but has valuable maps and data that apply to the export trade as well.

*The Black Diamond Year Book.*

This gives much data on our coal exports, analysis of coals and tonnages, with a complete directory of all mining companies.

*Panama Canal Traffic and Tolls;* Report by Prof. Emory R. Johnson to the Secretary of War, Washington, 1912.

This contains much valuable data. Chapter X, on coal facilities and costs *via* the Panama Canal and other routes, gives costs and coals used at different ports, analysis, comparative consumption of different fuels in actual use, etc.

*The Coal Trade;* published annually by the *Coal Trade Journal,* New York.

A compilation of data and statistics on the year's business. It has considerable data regarding exports scattered through it.

*The Production of Coal;* annual publications of the U. S. Geological Survey, included in "Mineral Resources of United States."

This gives data on exports, the world's coal consumption, etc.

*The Coal Resources of the World;* Three Volumes and Atlas; an inquiry made under the auspices of the Second International Geological Congress; Toronto, 1913.

Descriptions of the world's coal fields, with outputs, resources and analyses. The United States and British sections are short and very general. The atlas is valuable and comprehensive.

*The Trade of the World;* J. D. Whelpley; New York, 1913.

A general consideration of the subject that does not go into the coal export trade particularly, but is of value to anyone interested, as showing the trend of the world's commerce and commercial activities.

*Annals of Coal Mining and the Coal Trade;* R. S. Galloway; Two Volumes; London, 1904.

An elaborate and interesting account of coal mining in England from the earliest times. It is of great value to anyone connected with the coal trade.

*Foreign Trade in Coal:* H. S. Jevons; Cardiff, 1909.

A valuable monograph giving data regarding the world's export coal trade, freight rates, German exports and rates.

*Transport Facilities of South Wales and Monmouthshire;* Clarence S. Howells; Cardiff, 1911.

### Papers on the Export Question in Coal Age

*Our Future in the Export Trade.* F. R. Wadleigh. Dec. 28, 1912; Feb. 8, 1913; Mar. 8, 1913.

Discussion of our export trade in general. Short description of the Welsh coals, with analysis. Also, analysis of Pocahontas and New River coals, consumption of coal in foreign countries, markets and transportation.

*Our Coal and Coke Exports in 1911.* Editorial discussion. Jan. 6, 1912.

Discussion of statistics and their relation to the trade.

*World's Consumption of Bunker Coals.* Jan. 27, 1912.

Statistics and discussion.

*The World's Coal Production.* Jan. 6, 1912.

*Our Export Trade in 1912.* F. R. Wadleigh. Jan. 11, 1912.

The 1912 trade and what it shows; the future possibilities and difficulties to be overcome.

*The Price War in the Markets of the Pacific.* Feb. 14, 1914.

*West Virginia's Foreign Rivals in the Pacific Markets.* Feb. 28, 1914.

*West Virginia's American Rivals in the Pacific.* Mar. 21, 1914.

General discussion of the future of the West Virginia coals in the West Coast markets. Gives comparative distance, prices and analyses and data regarding the cost of shipping coal by water to the gulf.

*Effect of the Panama Canal.* W. A. McCorkle, ex-Governor of West Virginia. May 30; June 20; July 11, 1914.

*Effect of the Panama Canal on the World's Coal Markets.* F. R. Wadleigh.

A criticism of ex-Governor McCorkle's article on West Virginia coals in the Pacific markets. Analysis of coals, distances, transportation, prices, possibilities of competition of different coals and oil, smokeless coals and briquetting.

*Export Trade and the Panama Canal. Colliery Guardian* (London). Extract from editorial. Feb. 21, 1914.

*The Welsh Coal Field.* Reprinted from *The Syren and Shipping.* London, 1906.

Describes the Welsh coal fields and coals, coal docks, railways and foreign trade and United States coaling stations. Also gives historical sketches of several of the large coal companies and description of their mines and coals.

*Wealth and Prospective Development of the West Coast of South America.* Journal of Association of Engineering Societies, Boston, March, 1908. A. Russell.

Gives data regarding coals and coal consumption. The coal fields and collieries of Chile.

*Mining Journal,* London, Aug. 21, 1909.

Describes coal deposits and coals used in Chile.

### United States Consular Reports

Many of these reports give more or less information regarding coal in foreign countries, but usually the data are not of much value or use. A practical list of numbers is given below:

**Uruguayan Coal Situation.** July 6, 1912.
**Ecuador Coal Imports.** Mar. 20, 1914.
**Coal in Bolivia and Peru.** Feb. 10, 1912.
**Conditions in World's Leading Coal Shipping Port.** Apr. 10, 1914.
**American Coal for Argentina.** June 2, 1914.
**Chilean Commercial Progress.** June 16, 1914. Gives products and importation figures.
**Increases of Fuel Consumption in Chile.** June 3, 1914.

### Iron and Coal Trades Review (London)

**French Imports of Coal. 1912.** Feb. 21, 1914.
**Coal Exports Prices.** (Editorial.) Sept. 5, 1913.
**Prices of Exported Coal.** (Editorial.) Sept. 19, 1913.
**The World's Coal Production and Consumption.** Apr. 3, 1914.
**German Coal Industry in 1913.** Feb. 13, 1914.
**Coal Trade of the United States.** (Editorial.) May 2, 1913. Discusses competition of Welsh and United States coals in foreign markets.
**The Progress of German Coal Exports.** July 4, 1914.
**Italian Coal Imports and Bunker Coal.** (Editorial.) July 19, 1912.
**The British Coal Shipping in 1913.** (Editorial.) Jan. 9, 1914.
**A Statistical Review of German Coal Industry.** Apr. 24, 1913. Complete data for 1913.

### Journal of Commerce (Liverpool)

**D. A. Thomas and His Future Connection with England and the United States.** Interview and Biography. Feb. 21, 1913. Interesting comparisons between English and United States coals and coal mining.
**American Coal Competition in the Mediterranean.** July 19, 1912.
**American Coal Export Trade.** July 3, 1914. Statistics of Exports from Baltimore and Hampton Roads.
**America's Foreign Coal Trade.** With especial reference to Hampton Roads coals.

### Colliery Guardian (London)

**The American Coal Trade.** (Editorial.) Dec. 12, 1913.
**American and British Coal.** May 9, 1913. Discusses the influence of the Panama Canal on coaling stations and bunker coal markets at Panama on the Pacific.

### Black Diamond (Chicago)

Export number, Oct. 5, 1912.
**American Coals Suitable for Export.** J. S. Burrows.
**Use of Fine (Small) Coal.**
**Export Statistics for Eight Months of 1912.**
**Advertisements of Three Large Coal Companies.**
**Some Data on Exports.**
Beginning with 1913, a page in each week's issue is devoted to the United States coal export trade, giving statistics, prices and freights, extracts from foreign trade papers and consular reports, etc.

### Shipping (New York)

In each issue under the heading "Coal Notes," are given various items on the export trade, including ocean freights.

### Coal Trade Journal (New York)

Gives, in each issue, a list of prices of Welsh coals and ocean freight rates.

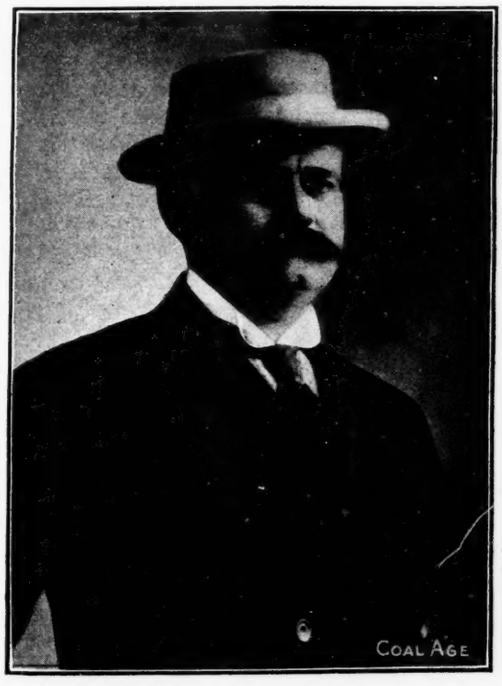
It must be understood that this list of books and articles on the export trade is by no means complete.

## Who's Who in Coal Mining

### John Markle

When we speak of America's independent anthracite coal interests, we must necessarily refer to the famous Markle family in Pennsylvania, for the two are practically synonymous. In fact, the history of the Markles is largely a history of hard-coal mining.

The creator of the firm of G. B. Markle & Co. was George Bushar Markle, who was born at Milton, Penn., July 1, 1817. This elder Markle started in Hazleton, Penn., as a clerk, advancing to bookkeeper, store manager and finally colliery superintendent. In 1857, after nine years of such training, G. B. Markle formed the firm which was later succeeded by the corporation now




JOHN MARKLE

bearing his name and operating four collieries in the Lehigh-Anthracite Region, with headquarters at Jeddo, Penn. No other anthracite property has such a record of 56 years of continuous operation under the same ownership and management by the same family interests. Most of the other independents have been absorbed by the railroad coal companies

Mr. Markle is known as the "father of the breaker," having designed the first one embodying real mechanical principles. His inventive mind also added many improvements to mine pumps, jigs, crushers and other machinery used in early anthracite mining. He gave up business in 1879, due to failing health, and died Aug. 18, of the same year, at the residence of his son John Markle, in Hazleton, Penn.

John Markle, the subject of this sketch, was born in Hazleton, on Sept. 15, 1858. He graduated from Lafayette College with the degree of mining engineer in 1880. Immediately following his graduation, Mr. Markle entered the coal business of his father as general superintendent of all the company's extensive coal properties in the anthracite region.

On the death of his father eight years later, John Markle purchased the entire interest of the Asa Packer Estate in the firm of G. B. Markle & Company, this interest ranking next to that of the senior Markle himself. This purchase gave Mr. Markle control of the property and caused him to assume complete management of the company's affairs.

In due time, Mr. Markle rebuilt the entire properties under his control, and today there is no evidence of any of the original buildings other than the miners' houses, even these having been greatly improved. He has increased the production at the Jeddo and Highland collieries from 360,000 tons in 1879, to 1,337,000 tons in 1913, and has guided the "Markle organization" to a high degree of efficiency. The G. B. Markle and Co. mines have worked steadily throughout recent years, affording a sharp contrast to the broken time worked by most of the other operators.

Mr. Markle's engineering ability was also shown by his work in connection with the Jeddo Tunnel, which is generally credited with being the largest drainage tunnel in the world. The construction of this huge underground waterway made possible the working of mines then thought to be hopelessly flooded, and makes the Markle mines at Jeddo and several adjoining collieries entirely self-draining. Short connecting tunnels could drain the Hazleton and other coal basins.

The tunnel is 7 ft. by 9 ft. and extends through five miles of solid rock. The cost of the work was in the neighborhood of $1,000,000.

In 1907, Mr. Markle suffered a serious impairment of his vision, but through the efforts of celebrated German oculists, the sight of one eye was saved. About this time the partnership of G. B. Markle and Co., of which he was managing partner, was incorporated into the present operating corporation of G. B. Markle and Co., of which concern, John Markle is president.

John Markle has inherited his father's fearless determination to stand for what is just and right, irrespective of any and all consequences. His success in the commercial and industrial world has netted him great wealth, but the possession of this he regards as a stewardship. It is his conviction that every man, if not incapacitated, should create more than he spends or destroys, irrespective of his position or inherited wealth.

Mr. Markle is known for his genuine desire to elevate his employees. No man could be more kindly in a practical way to those dependent on him. His charities are not heralded by the blare of trumpets, but they no less succeed in relieving those who are most in need. The beautiful marble library given to Hazleton is a memorial to his parents, and the recently completed casino, built at Jeddo is another tangible indication of his broad-minded generosity.

In 1884, four years after his graduation from college, Mr. Markle married Mary Robinson, daughter of Mrs. J. Hood Wright, of New York. He is a member of a long list of societies and organizations located in New York, Philadelphia and throughout eastern Pennsylvania. His home is at 723 Fifth Ave., New York City, although he still maintains his summer home at Jeddo.

# Editorials

## The Rights of Labor

The rights of labor are human and not superhuman. They should be rights, not privileges. Let the working man always remember that he is only a man and entitled only to a square deal, that even the successful, yet unfair, restrictions of capital by labor may prove veritable Pyrrhic victories in the end by putting one class of workingmen in the hands of another.

The Western Federation of Labor is about to become a branch or ally of the United Mine Workers of America. Already committees from both organizations are favorably discussing organic union. Our readers will pardon us, therefore, if we discuss the Western Federation, which is being fiercely attacked by the Industrial Workers of the World, or rather, perhaps, by a union more or less in sympathy with that organization. In fact, so severe is the disturbance that the Socialist officials in the town of Butte, Mont., have telegraphed for the state militia and word is received that Governor Stewart has ordered the Second Regiment of the Montana National Guard to mobilize at Helena, Mont.

The offices of the Anaconda Copper Mining Co. have been dynamited. Apparently that corporation committed the heinous crime of hiring Western Federation men against the wishes of the Industrial Workers of the World, who are requiring that every man must wear a button and enter their union and no other. The organization, not content with dynamiting Western Federation headquarters, disturbing their parades, driving out and killing their men, desire to arm themselves for an attack on the Anaconda Copper Mining Co. should the mines be closed down. They also threaten to burn down the city of Butte should federal troops or militia be sent to preserve peace.

We suppose that the United States will ultimately send troops and restore the *status quo* and will forbid any one to come to the mines to work, thus keeping Western Federation men from employment unless, being citizens or at least residents of Montana, one by one they are willing to face the violence of their enemies and in self-immolation enter the hostile camp. They may well be forbidden by the Department of War to engage themselves in numbers and at points outside the state, and the operators may be forbidden to purchase arms to protect them. For labor is no longer free. The stronger and more violent element has claimed the right to command the national forces and to control the situation. Even the majority of the miners does not rule as has been shown recently in Colorado and Nanaimo. Thus the miners who have set themselves against liberty have surrendered themselves by that act to violence.

It is to be hoped that recent events will convince the sober workingman, whose ascendancy is in doubt, but whose majority is unquestionable, that there are workingmen as also there are operators who need to be kept firmly in the narrow path of right behavior. No body of men can be left free of law and restraint.

For example, as the Grand Jury in Las Animas County, Colorado, has declared, the United Mine Workers of America have been in that county men of violence who should be curbed. National officers and leaders of the union, they say, have purchased and supplied arms to mobs and as a result there has been wholesale destruction of property and the killing and wounding of men, women and children by armed mobs made up of members of the United Mine Workers of America. They say that many persons connected with these outrages have been shielded and secreted by the miners' organization.

Clearly the union has in places proved that power can be abused by those who have it, regardless of the source from which that power is derived and from Butte the workingman may learn and he cannot know it too soon that the hand of the law must not be paralyzed or the heel of the mob will bear heavily upon the workingman.

## Miner's Certificates in Arkansas

In January of this year, the Federation of Labor and the United Mine Workers of America in Arkansas, initiated an act creating a state mining board. This by the "Initiation and Referendum Act" required 14,000 signers. There were 18,000 on the petition.

On July 15, the Operators Association of Arkansas sought to have a decree entered against the petition, alleging fraud in obtaining signatures to the instrument, and on Aug. 13, Chancellor J. E. Martineau, of the Pulaski Chancery Court, entered a decree enjoining Secretary of State, Earl U. Hodges, from certifying the proposed act to the election judges. The Federation of Labor appealed the case to the Supreme Court, which is now on vacation and will not convene till Oct. 1, 1914. The state election will be over by that time, being held on Sept. 14. So the act cannot be passed by vote for two years.

This law requires certificates for mine managers, superintendents, mine foremen, "gas men," hoisting engineers, mine inspectors, fire bosses, pit bosses and coal miners. The latter must be able to pass an examination as "to their practical knowledge of mining coal." The law also states "that it shall be unlawful for any person to engage in mining coal without first having obtained a certificate of competency."

It is clear that under this law no one can mine coal but those who *have* mined it; thus all men who are not miners and even miners' sons are excluded. It is evident that the law would either be deliberately misinterpreted or it would, if also passed in other states, cause coal mining to become a lost art in a few years for the ranks of the coal miners could not be recruited. Not a word is said about laboring under a coal miner, as in the Pennsylvania law.

Either the law is made with the idea of evasion or else inadvertently the miner has made the walls so tight that his own children cannot follow the same profession as he

follows himself. It may be possible that evasion of the law is purposed for the miners are to have a majority on the board, one of the members is to be a practical mining engineer, one a mine operator and three are to be practical miners "actually engaged in digging coal" at the time of appointment.

Believing that every man should have the right to aspire to be a miner or a butcher or whatever you please, without being required to violate any law or asking any board to violate the law for him, we unhesitatingly condemn any such enactment as a gross interference with the rights of workingmen. Certificates for coal mining, such as the anthracite region of Pennsylvania has, are bad enough, but that is largely because of the racial differences of the people, which make it necessary for an English-speaking man to work for a Pole or a Slav and because it compels able miners from another state or nation to work for less competent men to get certificates. Also because these certificates have often been obtained fraudulently. But this law is objectionable in different ways. It would, if made nation-wide, close the trade of coal miner to all but those who are now so engaged.

Mine foremen or gas men under the provisions must have "five years' practical experience in mining coal," mine inspectors must have "five years' practical experience as an actual coal miner," and fire bosses and pit bosses, "five years' practical experience as a coal miner." The bars are let down to hoisting engineers, but they must have "practical knowledge of mining coal." It seems entirely needless that hoisting engineers should have such knowledge, but we must admit that we are assured that no attempt is being made to corner all positions for the advantage of the coal miner, for the requirement as to mine managers and superintendents is not any too severe. They must have "five years of practical mining experience."

We would suggest that the signers having two years before them make the proposed act more in accord with reason and also go over it carefully and see if they have not repeated themselves several times in Section 6 without any necessity. The act as drawn is quite vague. It has no definitions and it might be quite easy to evade some of its provisions because its application is to men of a given title and not to men performing specific duties.

## Our Last Thought Is Too Often of Ourself

In our daily struggle for success we endeavor to be alert, yet cautious. We try to marshal our forces to the best advantage and waste as few shots and as little energy as possible.

Safety, Efficiency, Conservation are the ruling thoughts of our very existence. To reduce costs and eliminate risk are the chief aims of our life.

Too often, however, the last person we consider is ourself. We forget that we cannot discharge our duty to others unless we first fulfill our duty to ourselves.

The person who is negligent of his health and careless of habits that destroy body and character is not only useless as a member of society, but is a pernicious influence generally.

The prime essential of right living is a knowledge of the laws of our being. It is because the origin, development and decay of life are beyond our comprehension that we recognize the necessary existence of a great unknown power. The danger is that in giving reverence, we neglect obedience, and violate mandates written in nature's laws.

When a friend gives us a present merely through kindness, and not to enrich us, it is the giving we appreciate more than the gift; but when we are presented with a gift of great value, it becomes a trust, and we attempt to develop its possibilities.

Life is the greatest of all trusts; yet the great masses of humanity are ever ready to break the plainest and simplest of nature's laws. This is absolute evidence that we have not been properly taught.

Our violations are generally committed in youth, however; it is in middle life and old age that the punishment is imposed. If our carelessness brought immediate penalties, we would act differently.

An infant puts its finger in the candle, and the punishment is so immediate that one experience is sufficient for a lifetime. The anguish that so often fills many lives is usually the slow punishment of sins that comes after the lapse of years.

## Arkansas Ventilating Methods

The double-entry system of mining is such a common method of operation in all the leading coal-producing states of the Union that it is remarkable to find that in the State of Arkansas where there is often gas, the operators are opposing its further introduction. We imagine that if in the States of Pennsylvania and West Virginia the laws were all wiped off the statute books and every operator were allowed to do as he pleased, only those people who mined coal for local domestic use in a small way would seek to return to the old inefficient single-entry system by which slow progress is made.

However, we feel that Arkansas is partly to blame for this condition because it has passed a law requiring crosscuts in headings to be spaced at 40-ft. centers, where there is no gas present and at 30 ft. or even a less distance where there is gas. Such a provision tends to support the operator in his preference for the single-entry system. The chain pillar is cut up until it has no strength and the method is needlessly expensive. In the States of Pennsylvania, the mine inspector is expressly forbidden to require that crosscuts be driven closer than 48 ft. apart even in rooms and the distance may be at his discretion 105 feet.

In fact, it usually is nearer the latter figure. Even in Colorado, which has an unusually stringent law, the inspectors are allowed to let working faces travel 60 ft. beyond the air current, which does not mean that crosscuts be placed 60 ft. apart, as canvasses can be used to direct the current.

But unreasonable as we consider this requirement of frequent crosscutting to be, we cannot see why any company should refuse to drive a double-entry and we believe that in time the irreconcilables in that state will learn that a more liberal policy pays. There is hardly a state in the Union where such mining as we illustrate in the article on the "Double-Entry System in Arkansas" could be perpetrated, for the waste of coal and mining developments have proved it everywhere to be a folly.

# Sociological Department

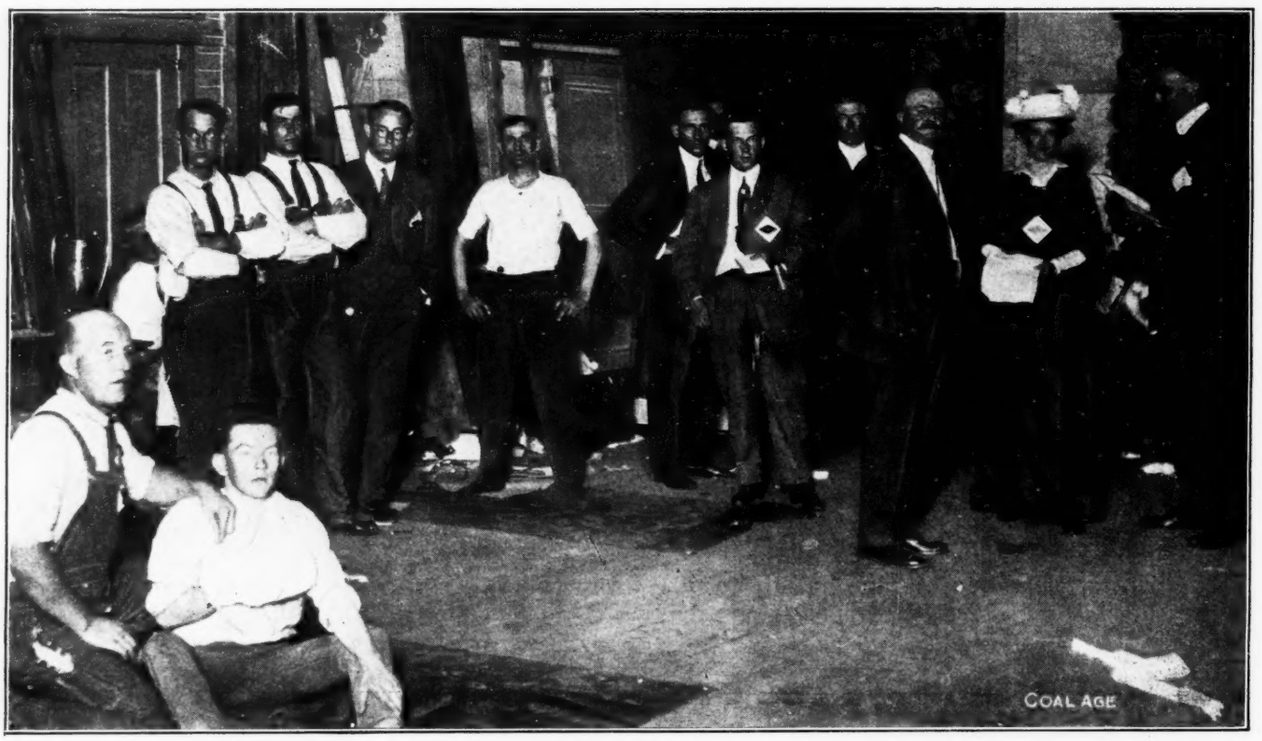
## The Lehigh Valley Meet

The first-aid movement at the collieries of the Lehigh Valley Coal Co., received added impetus at the third general contest, which was held on Saturday, Aug. 29, at Hazle Park, Hazleton. Vice-President and General Manager Fred M. Chase and other officials of the company were in charge.

Five teams, each representing the best in their respective divisions, participated in three full-team events. First place was awarded to the Westmoreland team of Wyoming, Lackawanna Division, of which W. D. Owen is superintendent. Derringer team, of Hazleton, Lehigh-Coxe Division, scored a tie with Westmoreland, both percentages being 99. The event was decided on the time taken by the contesting teams. Westmoreland completed the problems assigned in 27 min. and 45 sec., while Derringer consumed 29 min. and 16 sec. The Franklin team of Wilkes-Barre, Wyoming Division, also averaged 99, but took 34 min. and 5 sec. The Primrose team, of Mahanoy City, Delano Division, took fourth place with a percentage of 98⅞, while fifth place went to the Centralia team, of the Centralia Division, the average of that team being 97. Only the three leading teams were rated on the time consumed in performing their work, the other corps being placed solely on the merits of their performance regardless of their rapidity in action.

The high averages attained by every entry speak well for the training which the members have received. The men in direct charge as captains were given an opportunity to display their proficiency in an individual contest, and Simon Fellin, of the Derringer team, emerged the winner with an average of 99½, while Anthony Gludding, of the Primrose team, was a close second, his percentage reaching 99¼. John O'Neil, of the Franklin team, was only ¼ of a point behind Gludding, and O'Neil was tied with James R. Morris, of the Westmoreland team. The standing between O'Neil and Morris was therefore decided on the time allowance, which gave O'Neil the advantage. O'Neil finished in 3 min. and 45 sec., while Morris' time was 9 min. and 9 sec. John Wilson, of the Centralia team, performed his task in excellent time and made an average of 97½. It had been announced before this contest that the winner would be taken as a representative of the Lehigh Valley Co. at the meeting of the American Mine Safety Asosciation, to be held in New York City on Sept. 7. The captains acquitted themselves so creditably, however, that General Manager Chase made an announcement that every man who participated in the individual contest will also be taken along. This move on the part of the officials indicated the admirable attitude which they have assumed toward their first-aid men. When the announcement was made known to the big assemblage that packed the park theatre, prolonged applause arose.

The Westmoreland team was presented with the valuable silver loving cup, which the Derringer team, one of the best organized in the anthracite region, held last year and had high hopes of holding again. It will be put up for contest at the next general meet in 1915. The cup, in order to be retained permanently, must be won three times. Westmoreland has won it only once. As a further award, every member of the winning aggregation will be taken to the American Mine Safety Association meeting.




TEAM MEMBERS, OFFICIALS OF LEHIGH VALLEY COAL CO. AND JUDGES

The judges were Miss A. M. Anderson, a graduate of a New York hospital training school and who at present is superintendent of the Social Service Department of the Wilkes-Barre City Hospital; Dr. W. A. Lathrop, superintendent of the State Hospital, Hazleton, Penn., and Dr. Lawrence Thompson, of Wilkes-Barre, Penn.

After the awards had been made, General Manager Chase gave a brief address, in which he congratulated the men and commended them for the noble work which they are rendering in the service of suffering humanity. Thomas Thomas, general inside superintendent of the Lehigh Valley Coal Co., gave a splendid talk on first-aid work.

Before the contests started, John M. Lloyd, efficiency en-

THE TEAM OF THE WESTMORELAND COLLIERY, LACKAWANNA DIVISION; THE WINNING TEAM

From left to right John F. Reynolds, mine foreman; Jas. R. Morris, captain; Edward Reap, Thomas Ridgeley, Walter Jacoby, Joseph Johnson, Fred Halpin. Rear row: George P. Gallagher, assistant division superintendent; G. F. Hileman, outside foreman.

gineer, delivered an address of welcome, in which he declared the purpose of the meeting. Charles F. Johnson, superintendent of Kis Lyn, also spoke and complimented the Lehigh Valley Coal Co. and its employees for what they are doing to conserve human life. At noon, a substantial lunch was served in the park dining room, and between courses brief talks were given impromptu by the officials. Among the guests were Alvin Markle, coal operator, of Hazleton; General C. Bow Dougherty, superintendent of the Susquehanna Coal Co., Wilkes-Barre, Penn.; H. Heffler, of Centralia; W. H. Davies, of Lehigh-Coxe, and J. H. Haerter, of Wilkes-Barre, Penn.

Efficiency Engineer John M. Lloyd was in general charge, M. W. Price in direct charge, and the scorekeepers were Herbert I. Quinn and M. E. Terwilliger. For the first time in the history of the Lehigh Valley first-aid contests, a time limit allowance was placed in the events. The affair was without doubt the most successful ever held by the company.

Five teams were entered in the first three events, each of the five divisions of the Lehigh Valley Coal Co. being represented.

OFFICIALS IN CHARGE OF MEET

From left to right: Atherton Bowen, scorekeeper; John Lloyd, efficiency engineer, in general supervision; Thomas Thomas, general inside superintendent of L. V. Coal Co., and M. W. Price, scorekeeper.

**Event No. 1, for Full Teams**—The problem was as follows: "Simple fracture of right kneecap. Compound fracture of middle third of left leg. Severe bleeding in spurts. Simple fracture of the jaw. Deep wound in palm of right hand." Time allowance, 15 min.

The judges and timers rendered decisions as follows in this event:

Franklin colliery team, representing the Wyoming division, 100 per cent.; time, 9 min. 55 sec. Primrose colliery, representing the Delano division, percentage 99; time, 11 min. 35 sec. Westmoreland colliery team, representing Lackawanna division, percentage 100; time, 9 min. 10 sec. Centralia colliery team, representing Centralia division, percentage 97; time, 9 min. 8 sec. Derringer colliery team, representing Lehigh-Coxe division, percentage 100; time, 9 min. 9 sec.

**Event No. 2, for Full Teams**—The same men who won the first event also won in this contest. "Compound fracture of the left forearm with severe bleeding in spurts. A simple fracture of right collar-bone. Crushed left foot. An open wound entire length of right shin bone and feet." Time allowance, 10 min.

The result of this event follows: Franklin colliery team, Wyoming division, percentage 98; time, 11 min. 40 sec. Primrose colliery, Delano division, percentage 97; time, 7 min. 35 sec. Westmoreland colliery, Lackawanna division, percentage 98; time, 8 min. 13 sec. Centralia colliery, Centralia division, percentage 97; time, 8 min. 20 sec. Derringer colliery, Lehigh-Coxe division, percentage 92; time, 10 min. 2 sec.

**Event No. 3, for Full Teams**—"Fracture of pelvis on right side. Compound fracture of middle third of left thigh with severe bleeding in spurts." Time, 15 min.

THREE OF THE CAPTAINS

From left to right: Simon Fellin, captain of Derringer colliery team, first prize; Anthony Gludding, captain of Primrose colliery team, second prize; James R. Morris, captain, Westmoreland colliery, third prize.

The judges made the following announcement on this event: Franklin colliery, Wyoming division, percentage 99; time, 12 min. 30 sec. Primrose colliery, Delano division, percentage 100; time, 9 min. Westmoreland colliery, Lackawanna division, percentage 99; time, 10 min. 22 sec. Centralia colliery, Centralia division, percentage 97; time, 15 min. 54 sec. Derringer colliery, Delano-Coxe district, percentage 99; time, 10 min. 2 sec.

**Event No. 4, for Individuals**—The captains of each of the five teams which took part in the first three events were the competitors in the individual contest event. The problem was as follows: "A man in falling to the ground grasps an electric wire with his right hand. Rescue and give artificial respiration for 1 min. Treat for burns of the right hand. Time allowance, 9 min."

The results of this event follow: John O'Neill, captain of Franklin colliery, of Wyoming division, percentage 99; time, 3 min. 45 sec. Anthony Gludding, captain of Primrose colliery of Delano division, percentage 99¼; exceeded the time limit. James Morris, captain of Westmoreland team, Lackawanna division, percentage 99; time, 9 min. 9 sec. John Wilson, captain Centralia team, Centralia division, percentage 97½; exceeded time limit. Simon Fellin, captain Derringer team, Lehigh-Coxe division, percentage 99½; time, 5 min. Fellin was declared the winner of this event, having the highest percentage and having worked the problem well within the time limit.

The teams which represented the different districts were comprised of the following:

JUDGES OF CONTESTS
From left to right, Dr. W. A. Lathrop, Miss A. M. Anderson and Dr. Lawrence Thompson

Westmoreland colliery (winning team), representing the Lackawanna division—James Morris, captain, electrician; Edward Reap, assistant foreman; Thomas Ridgley, mason; Walter Jacoby, siltman; Joseph Johnson, fireman; Fred Halpin, subject.

Franklin colliery, representing the Wyoming division—James O'Neil, captain, assistant foreman; William Morgan, trackman; Edgar Boston, bratticeman; Hugh Owens, bratticeman; Henry Hennerty, bratticeman; Harry Thomas, subject.

Primrose colliery, Delano division—Anthony Gludding, captain, pumpman; Joe Maher, pumpman; Daniel Lewis, footman; Daniel Jenkins, driver.

Derringer colliery, Lehigh-Coxe division—Simon Fellin, captain, pumpman; Andrew Bretz, miner; Arthur Michael, helper; Roy Schell, trackman; Clarence Curtier, pumpman.

Centralia colliery, Centralia district—John Wilson, captain, pumpman; Edward Britt, pumpman; Thomas Lamb, footman; Nicholas Willis, bratticeman; Jesse Heist, footman.

## Developments in the Export Trade

At the present moment the fate of the export coal trade appears to be hinging on the ability to get vessels at reasonable rates. Further complications are also developing, as, for instance, it is stated that the French government has commandeered all coal carried in French vessels. It is obvious, therefore, that shipments in such boats are not being attempted, except where there is a thorough understanding with the government.

In a press interview, D. J. Wittenberg, President of the Pocohontas and New River Coal Co., predicted last week that American exports to Europe would aggregate one million tons by the first of the year, providing no serious obstacles in transportation or credits arises.

One of the largest deals reported is that said to have been closed by Spanish interests, involving 2,800,000 tons of steam coal. The contract is said to run over a two-year period, and is for delivery at Buenos Aires, Montevideo and Rosario. Loading will be at Philadelphia, Newport News and New York, and the reported price is $2.75 per ton, f.o.b.

At San Francisco, the German steamer "Mazatlan" was held up by the Collector of the Port just as she was about to sail with 500 tons of coal. The coal was contained in sacks, and it was believed that it was destined for the German cruisers "Leipzig" or "Nurnburg."

At Philadelphia, the North German Lloyd steamship "Brandenburg," said to be loaded with 10,000 tons of coal, took out clearance papers for Bergen, Norway, on Aug. 21.

The Hamburg-American steamer "Græcia" cleared from New York on the night of Aug. 27 with 3000 tons of coal for Cadiz, Spain. It is rumored that the coal is destined for the "Kronprinz Wilhelm," which left New York Harbor on the night of Aug. 3 and was last reported in West Indian waters. On the afternoon of Aug. 29, the steamer "Macedonia" of the same line sailed from New Orleans with 5000 tons of coal, in addition to other large supplies. This is the first German vessel to sail from this port since the war was declared. Although ostensibly destined for Cadiz, Spain, it is believed that these supplies are intended for the German cruiser "Dresden."

As regards the foreign situation, the British Government has receded from its demand for a "triple bond" on all export shipments, as was generally expected. This has considerably relieved the tension in foreign markets, particularly in Italy where the situation showed indications of becoming acute. The problem now facing the British exporters, and also those in this country, has resolved itself into one of financing. It would seem that the different governments might advantageously arrange to guarantee payments by responsible purchasers.

Reports from England are of a rather conflicting nature, it being noted on one hand that the government has requested the collieries to work on Sunday, while on the other hand, it is stated that there are enormous supplies at all the shipping points because of the almost complete suspension of industrial demand. The only serious difficulty the British operators now seem to be facing is in transportation lines. The heavy burden thrown upon the railroads of the country in moving the troops and muntions of war has so congested the service, that trouble is being experienced in this line.

Recent issues of the *Daily Consular and Trade Reports* contain the following notes relative to the export trade and foreign mining conditions.

*South America*—A telegram from an American consular officer in a South American country stated that the Government railways want 300,000 tons of coal annually for three years. Particulars are being forwarded by the first mail from the consulate.—No. 13583.

*Europe*—An American consul reports that two coal merchants in a European country desire to receive offers from American coal exporters and also some publications on the trade. Correspondence should be in French, and copies should be sent to the consulate submitting the report.—No. 13572.

# Discussion By Readers

## The Flame of a Mine Explosion

In connection with the many experiments made to determine the correct explanation of the phenomena observed at the mouth of a mine, at the moment of explosion, COAL AGE, Aug. 22, p. 295, the following incident illustrating the wonderful expansive force of the flame of an explosion, on reaching the open air, will prove of interest:

The Palos mine explosion occurred May 5, 1910, at Palos, Ala. In this mine, the main-slope heading was quite contracted. The narrowest place in the heading had an area of less than 27 sq.ft. The gases and dust projected from this small opening at the moment of the explosion, took fire in the air and the flames spread on each side of the mouth of the mine, to a distance of over 80 ft., burning and scorching the leaves on the trees and bushes in that area. Wood was charred at a distance of 105 ft. from the mouth of the mine, in the direction of the axis of the slope, and a mail carrier was killed some 70 or 80 ft. away from the mine entrance. He was burned worse than any other man killed in that explosion. Had it not been for a heavy railroad trestle, in its path, the flame would have reached a still greater distance.

The sight was witnessed by a number of men, who stated that the flames leaped upward to a distance claimed to be anywhere from 200 to 500 ft. in height. I mention this incident as showing how the flames of an explosion would spread in a mine where the air conditions are in its favor.

GEORGE T. MAIN,
Fireboss.

Republic, Ala.

## A "Mine-Run" Failure

The fact that the mine-run law, recently enacted in Ohio, is a failure, at least in the No. 8 seam, is proven quite conclusively by the statement of eastern Ohio operators, to the effect that the shutdown of the Block House mine of the Dexter Coal Co., a branch of the Pittsburgh-Buffalo Coal Co., was necessary owing to the high cost of production.

An investigation of the cost of operating this mine showed that the coal mined on a run-of-mine basis was being produced at an increase of 16c. above the price prevailing the preceding year. The giving out of this information has caused much comment in mining circles, since the fact was well known that the court was desirous that this mine should continue in operation. Since they began operating on the run-of-mine basis, the company have had constant complaints in regard to the preparation of the coal, which is another feature requiring careful consideration. When it was finally found impossible to reduce the cost of production so that it would more nearly approximate that of the previous year, it was decided to close down the mine, since, to continue in operation, was merely piling up debts for the already embarrassed company.

The suspension of the Block House mine has set everyone interested in the success of the coal-mining industry in the state, to thinking seriously over the various developments and conditions following in the wake of the strike. The utter uselessness of the operators in the No. 8 seam, attempting to operate on a mine-run basis is apparent to everyone.

This feeling is growing stronger every day; and it would not be surprising if, as is indeed already rumored, a large class of miners will soon be endeavoring to arrange conferences with the operators, for the purpose of negotiating a contract under a wage scale that will permit the operators to run their mines on the same basis as last year. This would seem to be the only practical solution of the problem. The instance to which I have referred, namely, the shutting down of the Block House mine, is only an example where the new system has been given a thorough trial and been found wanting.

O. P. RATER.

————, Ohio.

## Keeping Rooms on Sights

I was pleased to see the inquiry in regard to driving rooms on sights, COAL AGE, Aug. 22, p. 317. About a year or so ago, we were having much trouble, in the mine, with the rooms "holing" into each other, due to the carelessness of the "cutters" or machine runners.

Our rooms are turned off at right angles to the butts and driven on the face of the coal. The rooms are driven on 50-ft. centers and are 28 ft. wide, leaving a "rib" (room pillar) 22 ft. wide. The rooms are driven up anywhere from 200 to 300 ft. and a chain pillar 40 ft. wide is left along the entry. It was a common everyday occurrence to find an unexpected breakthrough at the face of a room.

Having a compass at the mine, and both the mine foreman and myself being able to set sights, we decided to try out the method of driving all rooms on sights. This was not a difficult matter, after we had once caught up with the men; but, as our friend from Kentucky states, the sights were often disregarded, and we found it a difficult matter to get the men to pay proper attention to them.

However, after a few of the careless ones had a week or so off, and the loaders were forced to take a "skip," which was always pickwork, at loading price, they began to sit up and take notice of the "sights." I am pleased to say that, at the present time, we are having no trouble of this kind, and the "holing" of rooms into each other is a thing of the past. The ribs in the rooms will scarcely vary 2 ft. their entire length. There is, of course, an occasional error in setting the sights; but this is generally soon detected before it causes any trouble.

The process is as follows: When a room has been "necked" and as soon as the first three cuts are taken

out, before the switch is laid, we set up the compass and put in a pair of sights on the course the room is to be driven. All sights are placed on the same side of the room, about 4 ft. from the ribs. The neck is driven narrow for about 60 ft. Then, the cutter drops back about 20 ft. from the face and widens the place on the opposite side from the sights.

It is sometimes claimed that carrying rooms on sights is a hard matter, but this is not my experience. A good entryman will drive his entry from one station to another and will scarcely vary a foot, in going 300 or 400 ft. by the sights set by the engineer. If this can be done in the entries, why not in driving rooms.

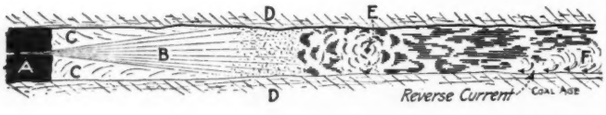
Before a machine is taken to the face of the room, the cutter will generally send his helper up to the face to see that it is in proper condition. If all is ready, the helper is instructed to hold his lamp at the face, and the cutter lines him in by the sights in the neck of the room. This being done, an arrow is marked on the roof with a piece of chalk. This shows the cutter, at a glance, whether the rib is to be gripped or set back.

JAMES P. REYNOLDS, Fireboss,
Pine Run Co.
Vandlegrift, Penn.

## The Verner Theory

Referring to the editorial on this subject, COAL AGE, Aug. 15, p. 273, I notice the statement that the "theory about the counter air current in a mine explosion has gradually gained strength." In a previous letter, I asked Mr. Verner to explain his theory of the counter-current by means of diagrams. He did not do this, however, but Mr. Parfitt came to the rescue with an explanation of the phenomenon, illustrating it by means of a sketch, COAL AGE, Vol. 5, p. 1059.

Referring to this sketch, Fig. 1, Mr. Parfitt assumed that the so called "reverse current" started at a point marked *F* in the figure. It is clear, however, that no such reverse current could be produced until the force exerted by the powder or other explosive had expended its




IDEAL SKETCH, ILLUSTRATING THE INITIATION OF A MINE EXPLOSION

energy. It would also seem that, at the point marked *C* in the figure, the air would be in a state of compression instead of a "depression or vacuous condition" existing, as he stated, assuming the shot was fired in the face of a heading. There might be a suction effect or depression if such a shot were to be fired at a gate-end, on a longwall face. I have tried to illustrate this suction effect, in Fig. 2. Here the firing of the shot *A*, at the gate-end would naturally draw air from the face on each side of the shot, as shown by the small arrows in the figure after the principle of an injector.

From Mr. Parfitt's illustration, Fig. 1, it might be assumed that the reverse current *F* resulted from the cooling of the heated gases from the blownout shot; but, here, the explanation is dropped. Mr. Verner would have done well to have taken up the explanation at this point and showed what followed the starting of the reverse current at the point *F*.

In my opinion the presentation of any theory should be accompanied by sketches or diagrams to make the intended meaning clear; and should be further supported by references to actual occurrences, as far as possible. In differing with Mr. Verner, in reference to his theory of the reverse current being a factor in the initiation of a mine explosion, I shall endeavor to explain my ideas by reference to observed occurrences, and to illustrate these by brief sketches that will assist the understanding.

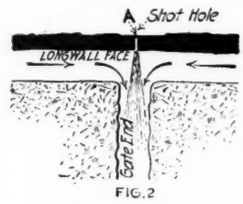



FIG.2

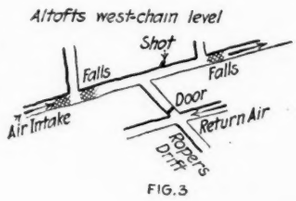



FIG.3

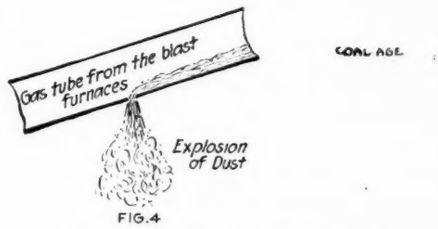



FIG.4

ILLUSTRATING MINE-EXPLOSION THEORIES

In practically every mine disaster with which I have had an intimate acquaintance and which was caused by the firing of a shot, I have observed that there was invariably a large cavity or air space in the immediate neighborhood of the blast. Again, I have observed another important feature of such disasters, namely, there is always a considerable area, in the immediate neighborhood of the blast, in which there is little or no evidence of damage having been done such as is plainly observable at a distance more removed from the initial point where the shot was exploded.

Referring now to a case in point, namely, the Altofts explosion, Fig. 3 shows approximately the position of the shot that was the primary cause of this disaster. The shot was drilled in such a direction, in the rib of the west-chain-haulage road, that when it blew out, the heated gases and solid matter were projected *against the air current*, which is shown in the figure by the small arrows. In this case, the nearest large air space was the heading known as "Roper's drift." It was observed, in this explosion, that the men who were killed had taken warning that all was not right and had moved from the manholes where they had gone for shelter. The distance these men moved from their position when the shot exploded, indicates a certain lapse or interval of time between the blowing out of the shot and the second blast or explosion, which killed them instantly. A similar interval of time has been observed on other like occasions, where men have been warned of the danger and sought to escape, but were killed instantly by a second blast. In the Altofts mine, there was little or no damage done, for a distance of about 75 yd. on either side of the shot.

My opinion, based on these facts, is that when a shot blows out, the heated gases and particles of solid matter are projected into the mine roadway where the blast stirs up the dust. At this initial moment, the immediate atmosphere in the vicinity of the shot is quickly rendered devoid of oxygen, which makes an explosion of the dust and gases at this point impossible. I believe the interval of time that intervenes until the expanding and projected gases meet with a sufficient volume of air for their explosive combustion, is the brief period in which the later victims of the explosion attempt to escape and move from their places for that purpose. The real explosion that wrecks the mine, I consider, is that which occurs when these heated gases and dust encounter sufficient air for their combustion.

In support of this conclusion, I want to refer to an incident observed when passing through a blast-furnace ironworks, on an idle day when the men were cleaning out the gas mains connecting the tops of the furnaces with the battery of boilers. In doing this work, the dust and soot accumulated in the mains were scraped to the handholes in the bottom of the tubes (Fig. 4). The men had taken the precaution to dampen the dust inside the tube and never to open a handhole in advance of the portion of the tube that was being scraped. The reason for this was quickly evident after observing what took place when the heated dust fell through the handhole into the air below. A dense black cloud of dust would fall for a considerable distance and then burst into a violent flame or explosion. This, to my mind, is a simple illustration of what happens in a mine when a blownout or windy shot is the cause of an explosion such as that at Altofts.

Unless I wholly misunderstand Mr. Verner, he is at a complete loss to show where his reverse air current would assist in explaining the Altofts disaster, or the explosion of the dust as observed at the ironworks, just mentioned. Neither Mr. Verner nor Mr. Parfitt has shown any reverse current other than that due to the cooling of the heated gases, which occurs in what is properly called the "condensation stage" common to every mine explosion and which is nothing new in respect to such occurrences.

In closing, permit me to say that, whatever new points may be raised in connection with this theory, it has not yet been shown what influence the reverse current can exert at the initial point of an explosion. What follows this is not pertinent to the question. Therefore, what Mr. Verner has called the "counter air current" is still without any clearly defined explanation.

JAMES ASHWORTH,
Mining Engineer.

Vancouver, B. C., Canada.

# Study Course in Coal Mining

BY J. T. BEARD

## The Coal Age Pocket Book

### PLAN OF MINE

**General Requirements**—In the planning of a coal mine the most careful consideration must be given to the questions of **ventilation, drainage** and **haulage,** as these arrangements, to a great degree, determine the successful operation of the mine.

In order to insure the safe and economic extraction of the coal, the same careful consideration must be given to ascertaining the extent and character of the seam, its depth below the surface, inclination and thickness, the character of the roof and floor and the hardness of the coal, its cleavages and faults, impurities, etc.

The information thus gained will be of the first importance in deciding on the most suitable method of mining to adopt, in order to secure the largest returns on the investment, the most complete extraction of the coal and the greatest safety in mining the same.

**Economy and Efficiency**—The **economic ventilation** of a mine premises the circulation of the required air volume, with the least expenditure of power. **Efficient ventilation** requires the circulation and proportionate distribution in the mine workings, of such a volume of air as will not only meet the requirements of the law; but, likewise, produce the necessary velocity in all roads and passageways and at the working faces of all headings and chambers, so as to sweep away the smoke and gases that would otherwise accumulate therein; and to so ventilate all waste, void and abandoned places as to prevent them from becoming a menace to the safety of the mine as reservoirs for the accumulation of gas.

**The Main Airways**—While two airways, an intake and a return airway of sufficient size, furnish the necessary means for conducting the air current to and from the working faces of the mine, there are other considerations of economy and safety of operation that demand a larger number of main airways.

The **number** of main airways required, in any case, is determined by their size and the necessary volume of air that must pass through them. The limiting factor in this calculation is the safe and economic **velocity** of the air current traveling the main airways.

While too low a velocity of the air is dangerous because of its failure to remove the accumulating gases, too high a velocity, on the other hand, is dangerous by reason of its increasing explosive conditions in the mine air, by raising and carrying in suspension fine dust, and by furnishing an excessive supply of oxygen that invites active and explosive combustion.

The velocity of main air currents in mines can safely vary between 250 and 1200 ft. per min.; and for short distances a velocity of 2000 ft. per min. may be permitted, although high velocities rapidly increase the power producing the circulation. Where the main intake airways are used for haulage roads, it will not be possible or advisable to employ a velocity much exceeding 400 or 500 ft. per min., owing to the annoyance and danger of drivers losing their lights.

## The Coal Age Pocket Book

**Illustration**—In the planning of a mine for an output of, say 2000 tons of coal per working day, in a 6-ft. seam of more or less inflammable bituminous coal (shaft, slope or drift openings), the following data may be assumed as approximating possible conditions, but modified to suit known facts that have been determined, in special cases:

| | |
|---|---|
| Output per man per day (average) | 2½ tons |
| Number of miners employed (2000 ÷ 2.5) | 800 |
| Number of loaders or helpers | 400 |
| Number of drivers, trackmen, timbermen, etc. | 60 |
| Foreman, assistant foremen and firebosses | 20 |
| Total number of men and boys | 1280 |
| Number of mules | 25 |

Assuming a gaseous mine requiring, by law, say 150 cu.ft. of air per man, and 600 cu.ft. per mule, per minute, the necessary circulation based on these data would be (1280 × 150) + (25 × 600) = 207,000 cu.ft. per min.; or, to allow for certain leakage, say the necessary air volume is, in this case, 225,000 cu.ft. per min.

Driving 10-ft. openings in a 6-ft. seam and allowing for necessary timbering would leave an unobstructed effective area of, say 50 sq.ft. In this case adopting a 4-entry system for the intake and the same for the return, would give for the total effective intake and return areas, each 4 × 50 = 200 sq.ft., which would make the velocity of the intake air current 225,000 ÷ 200 = 1125 ft. per min., which is a safe and economical velocity, provided these airways are not used as haulage roads.

To provide for the expansion of the return air, owing to rise of temperature and addition of mine gases, which may altogether amount to 6 or 8 per cent., the return airways should be driven, say 8 or 10 in. wider than the intake airways.

**Economy of Multiple Main Airways**—The economy of driving a multiple system of main airways will not be questioned in the planning of large operations. The same plan should be applied to the opening of mines on a smaller scale, the objective point being to keep the velocity of the main air current so that it will not exceed 1200 ft. per min., for any considerable distance.

The saving in power (fuel consumption, equipment and attendance) will pay for the increased expense of upkeep of entries; and the system affords a large increase in safety by reducing explosive conditions and providing additional avenues of escape in case of accident. There is afforded, besides, room for a double-track haulage system, which will prove a great advantage in the operation of the mine.

Assuming that one-half the power on the air is consumed in the main airways, which more or less closely approximates the fact, and taking the general efficiency of the fan and engine as 60 per cent., a double-entry system, for the main intake and return airways, would effect a saving in fuel of 11.25 per cent.; a triple-entry system, 13.32 per cent., and a 4-entry system, 14.10 per cent.

# Inquiries of General Interest

## Ventilation Question

The following question, which was asked at a mine inspector's examination held at Pittsburgh, May, 1909, has recently aroused considerable discussion as to its correct answer. We would very much appreciate seeing this question answered in the columns of COAL AGE. It is as follows:

A total of 8000 cu.ft. of air passes through three airways, *A*, *B* and *C*, under a water gage of 1.7 in. All the airways have the same sectional area and their lengths are as follows: *A*, 6000 ft.; *B*, 10,000 ft.; and *C*, 21,000 ft. It is desired to increase the quantities of air passing in the airways *B* and *C*, so that all three airways shall pass the same quantity of air (in other words, the main air current is to be equally divided between the three airways).

(a) What effect will this change have on the water gage? (b) How much will the resistance be increased in *A* and *B* when the change is made? (c) If the airways *B* and *C* were to receive as much air as the airway *A* gets now, what would be the total quantity of air in circulation?

A correct answer to this question will be greatly appreciated by a number of COAL AGE readers.

CHARTER SUBSCRIBER.

Pittsburgh, Penn.

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The question is, to a certain extent, incomplete, inasmuch as it does not state that the power on the air remains constant, which is the natural assumption to make, although the conditions in (c) clearly demand an increase of power.

Evidently, the first step in the solution is to determine which of the three airways will be the free or open split, requiring no regulator in the proposed redistribution of the air. This can be found by calculating the relative pressure potentials for the three airways, respectively. Thus,

Split *A*, $X_a = \frac{1}{\sqrt{l}} = \frac{1}{\sqrt{6}} = 0.4082$

Split *B*, $X_b = \frac{1}{\sqrt{10}} = 0.3172$

Split *C*, $X_c = \frac{1}{\sqrt{21}} = 0.2182$

$\Sigma X_p$ ..... 0.9426

The airway having the smallest potential value is the one that naturally takes the smallest quantity of air, and is therefore the one having the greatest resisting power; which fact makes it the free or open split, in the redistribution of the air. In the present case, split *C* is the open split, while regulators must be placed in the other airways, *A* and *B*.

In splitting, the pressure is the same for all the splits; and in this case, the pressure and quantity of air being the same for each split, the power on the air will be equally divided between them because the power is equal to the product of these two factors. The next step, therefore, is to find the original power on the air, which is assumed to remain constant after the change. Thus,

$U = Q\,p = 8000\ (5.2 \times 1.7) = 70{,}720$ *ft.-lb. per min.*

The simplest method of solution, now, is to find the quantity of air and the power, for split *C*, before the change was made; and, then, since each split absorbs one-third of the original power on the air, find the quantity of air that will pass in the open split *C*, according to the rule that the quantity of air circulating in an open airway varies as the cube root of the power. The water gage is then found, according to the rule that the water gage varies as the square of the quantity of air in circulation.

The quantity of air in circulation in an open airway being proportional to the pressure potential for that airway, the quantity for split *C* (natural division) before the change, is

$$q_{c_1} = \frac{0.2182}{0.9426} \times 8000 = 1852\ \textit{cu.ft. per min.}$$

But, the pressure being the same for all the splits, the power on the air for split *C* is proportional to the quantity of air passing in that split; thus,

$$u_{c_1} = \frac{1852}{8000} \times 70{,}720 = 16{,}371\ \textit{ft.-lb. per min.}$$

Since, after the change is made, split *C* absorbs one-third of the original power, it then consumes $70{,}720 \div 3 = 23{,}573$ ft.-lb. per min. Then the quantity of air passing in this split, which is open, having no regulator, is

$$q_{c_2} = 1852 \sqrt[3]{\frac{23{,}573}{70{,}720}} = 2091\ \textit{cu.ft. per min.}$$

(a) Since the pressure or water gage is proportional to the square of the quantity of air passing, the water gage, after placing the regulators for an equal distribution of the air, is

$$w.g._2 = 1.7 \left(\frac{2091}{1852}\right)^2 = 2.167\ \textit{in.}$$

(b) For the same sectional area of an airway, the resistance is proportional to the pressure or water gage; and is, in this case,

$$\frac{R_2}{R_1} = \frac{2.167}{1.7} = 1.274\ \textit{times}$$

(c) The quantity of air that was passing in split *A* before the change was made, is

$$q_{a_1} = \frac{0.4082}{0.9426} \times 8000 = 3464\ \textit{cu.ft. per min.}$$

If airways *B* and *C* each get this amount of air, the total circulation will be $3 \times 3464 = 10{,}392$ cu.ft. per min. This, however, would require a large increase of power. Assuming a constant power, as previously, the total circulation after the change is $3 \times 2091 = 6273$ cu.ft. per min.

# Examination Questions

## British Columbia Examination, May 20, 1914

(*Selected Questions*)

VENTILATION

*Ques.*—How many cubic feet of air is traveling in an air course which is 8½ ft. wide at the bottom, 7½ ft. wide at the top and 5½ ft. high, when the anemometer shows a reading of 85 revolutions?

*Ans.*—The average width of the airway is ½ (7½ + 8½) = 8 ft. and the sectional area is, therefore, 8 × 5½ = 44 sq.ft. Then, assuming the anemometer reading is 85 r.p.m., the quantity of air in circulation in this airway is 85 × 44 = 3740 cu.ft. per min. In this answer, no allowance is made for correction of the reading of the instrument, for the reason that the measurement of the velocity of an air current in this manner is only approximate at the best; and, in ordinary practice, this correction is neglected.

*Ques.*—If, by applying 42,000 units of work, you obtain 31,500 cu.ft. of air per min., what units of work will be required to produce 70,000 cu.ft. per min.?

*Ans.*—For the same airway, the power or units of work applied to the air varies as the cube of the quantity of air in circulation. In other words, the power ratio is equal to the cube of the quantity ratio, which gives, in this case,

$$\frac{x}{42{,}000} = \left(\frac{70{,}000}{31{,}500}\right)^3 = 460{,}900 \textit{ ft.-lb. per min.}$$

*Ques.*—Explain the principle of natural ventilation.

*Ans.*—The principle of natural ventilation depends upon the difference in the density of two air columns that would otherwise be in equilibrium; or, upon any dynamic force, such as wind pressure or the pressure of escaping steam that would give motion to the air in an airway or air conduit. The difference in the density of air columns may arise from a difference in temperature, the warmer air being lighter than air of a lower temperature, volume for volume; or the difference in density may be due to the presence of a considerable quantity of gases that are either lighter or heavier than atmospheric air.

A difference in density causes the heavier of the two columns to sink, by reason of its greater weight, the lighter air column being thereby forced upward. These air columns may exist in a mine shaft or slope or in dip or rise workings in the mine. The result is always a more or less rapid movement of the air from the point of higher pressure toward the point of lower pressure, the movement being due to the natural causes just mentioned.

*Ques.*—Explain the difference in the methods of producing an air current by a forced fan and by an exhaust fan.

*Ans.*—As far as the fan itself is concerned, the action is the same in both cases. The revolution of the air within the fan gives to it a centrifugal force that causes it to move from the center toward the circumference of the fan. It is this movement of the air within the fan that results in a depression at the central opening and a compression at the circumference or the discharge opening of the fan.

In the case of a forced fan, the fan drift is connected directly with the circumference and receives the air discharged by the fan, which air is conducted into the mine. Owing to the resulting depression at the central opening of the fan, the atmospheric air enters the fan at this point. In the case of an exhaust fan, the fan drift is placed in connection with the central opening of the fan, which therefore draws the air from the mine and discharges it into the atmosphere at the circumference through the fan chimney.

*Ques.*—When the barometer reads 23.2 in., what is the pressure of the atmosphere (a) per sq.in.; (b) per sq.ft.?

*Ans.*—(a) Since 1 cu.in. of mercury weighs 0.491 lb., the atmospheric pressure corresponding to a barometer reading of 23.2 in. is 23.2 × 0.491 = 11.39 lb. per sq.in. (b) This corresponds to a pressure of 11.39 × 144 = 1640+ lb. per sq.ft.

*Ques.*—In order to secure thorough ventilation in a mine, about what velocity should the current have at the face of the workings, both in gaseous and nongaseous mines?

*Ans.*—The thorough ventilation of a mine at the working face requires a velocity sufficient for the removal of the gases that would otherwise accumulate. In a nongaseous mine, for the convenience of the men, the velocity of the air current should not exceed 3 or 4 ft. a second, say 200 ft. a minute. At times, a less velocity than this is desirable. In a gaseous mine, assuming the air current is properly deflected by means of brattices, so as to sweep the face of the coal, a velocity varying from 240 to 360 ft. per min. should be sufficient for the removal of the gases, except in special cases in rise or dip workings that often render the efficient ventilation of the working face difficult.

The removal of marsh gas from the face of rise workings or carbon dioxide from the face of dip workings may frequently require a higher velocity of the air current. Under these conditions, proper precaution must be taken not to expose the safety lamps of the miners to the full force of the current, which may have a velocity of 600 ft. per min.

*Ques.*—How can you tell whether or not any obstruction is in an air course that you have not passed through?

*Ans.*—Any obstruction in an air course would be indicated by the decreased velocity and quantity of air in circulation and by an increase of water gage for that airway. A decrease in the quantity of air passing, together with a like decrease in the water gage would point to trouble outside of the airways in question, by reason of which the quantity of air supplied to that section has fallen below the normal quantity. Under a normal condition of the general ventilating system in the mine, an obstruction in any section or district of the mine will cause a decrease in the quantity of air passing and an increase of the water gage for that section.

# Coal and Coke News

## Pennsylvania

### Anthracite

**Wilkes-Barre**—With a view of insuring protection to surface property from mine caves, the Lehigh & Wilkes-Barre Coal Co. has requested the city of Wilkes-Barre to permit the driving of bore holes in the Heights section, the object being to ascertain how near the coal is to the surface, so that proper steps can be taken to safeguard property. Believing that the action of the company will enable the city to protect the section in question from the danger of mine caves, a resolution has been introduced in the City Council authorizing the company to drive the bore holes, but requires it to furnish the city with a copy of the results of the tests.

**Harrisburg**—Fifty anthracite coal companies have filed appeals from the amount of the anthracite coal tax assessed against them under the act of 1913, in the Dauphin County Court, and probably 100 companies have taken the matter to court. The auditor-general's department went ahead with its making out of bills for the amount of the tax based on the reports of the anthracite producers made on their output last year, some weeks ago. The test of the constitutionality of the tax brought in the Dauphin County Court by the People's Coal Co., of Scranton, in which a dozen or more companies joined, has not been decided, and the companies have determined to take the settlements into court, pending the decision on the case. Thus far but two coal companies have paid, and one of them under protest, so that it may be months before the coal tax is settled. No matter which way the case is decided in the Dauphin County Courts, it will be appealed to the Supreme Court.

**Pottsville**—Mining men have called attention to a possible shortage in the supply of dynamite, caused by the failure of manufacturers to secure raw glycerine, dynamite's chief ingredient, which is produced in Europe. Since the opening of the war, the price of glycerine has increased 100 per cent., and it is not improbable that traffic in the product may stop until the war has ended.

**Peckville**—Residents of Blakely Borough are somewhat incensed over the fact that culm is allowed to run in pipes from the breakers of the Mt. Jessup Coal Co. to the Lackawanna River, thus polluting the waters of this stream.

**Pittston**—After several days of waiting, the expected mine cave at the intersection of William and Ford Sts. occurred at noon, on Aug. 24. This settlement took down 40 sq.ft. of brick pavement, together with the track of the Scranton Traction Co. The sewer and water pipes were also damaged.

**Reading**—The anthracite market is becoming more active and inquiries are plentiful. The mines of the Philadelphia & Reading Coal & Iron Co., which have been working for three days per week for some time past, are now working five days per week. There is an improvement in the demand for all sizes, and the indications point to a busy fall and winter.

### Bituminous

**Greensburg**—Coal operators in this vicinity are making plans for one of the biggest booms ever experienced in the coal business in this part of the state. According to some of the leading operators, the closing down of the Welsh, German and Belgian mines has created a fuel shortage in Europe that threatens to tie up the industry in neutral countries all over the world. Steamships are seriously affected. The coal operators say they are only waiting for the Federal Government to provide the means of shipping coal to start one of the greatest periods of prosperity in the coal industry in this section.

**Johnstown**—The much discussed Boswell cut-off of the Baltimore & Ohio R.R. to Johnstown is said to have been suddenly projected into the region of probability. Several representatives have been sent to the vicinity of the proposed right-of-way to investigate conditions, it is said. The proposed line would give the Baltimore & Ohio access to a rich virgin coal field, besides creating an additional rail line out of the city to the south. The developments of coal lands in that vicinity is only a matter of a few years, according to coal experts, as borings have established the presence of rich beds of coal.

**Pittsburgh**—Because the breadwinners of the family have in many instances returned to Europe, the poor directors of western Pennsylvania counties are being besieged with applications for aid from destitute foreign families. Throughout the coke regions, the task of providing these people with food is becoming acute. The foreign populaaion is here large, and many of the men returned to their home countries before hostilities began.

### WEST VIRGINIA

**Charleston**—Miners who have been on strike at Boomer, Winifrede and Black Betsy have returned to work, under an agreement by which operations will be kept up pending the negotiations now on between the union and the Kanawha Coal Operators' Association. The trouble at these points rests principally on the discharge of miners by the superintendents, for various reasons, and the negotiations are now being conducted with reference to a clause in the three-year agreement specified reserving to employers full right to hire and discharge men. The point is to be settled, it is understood, by an umpire selected by the two boards.

**Fayetteville**—Several hundred men employed by the Paint Creek Co. in its operations in seven mines on Paint and Brier Creeks have been idle for several days, following the failure of the company to pay them at the usual time. This is said to have occurred before at the company's mines, and the men refuse to go back to work until they are paid. The mines affected are those at Mucklow, Wacoma, Banner, Tomsburg, Hickory Camp and Brier Creek.

**Dorothy**—The two mines of the Four States Coal Co., located on Coal Creek, near this place, have been closed down for an indefinite period, on account of the inability of the company to arrive at a satisfactory agreement with the miners. About 600 men are affected. There has been trouble at the mine for several weeks, conferences failing to evolve a settlement.

### ALABAMA

**Gadsden**—The Van Zandt Mine No. 2 of the Racoon Mining Co., near Gadsden, Ala., after having been closed down for the past year, has resumed operations. G. T. Schoolar, of Gadsden, is president.

**Cullman**—The Soutts Mountain Coal & Coke Co., which has been operating on an extensive scale near Cullman, Ala., for the past 15 years, having worked out its territory, has sold its stock and closed down. Robert Stephens, of Birmingham, is president.

**Cordova**—Sale of the properties of the Oakleaf Coal Co. will be transacted privately, as the auction sale was unsuccessful. This is the order of E. H. Dryer, referee in bankruptcy.

### TENNESSEE

**Knoxville**—A miners' field day will be held in Knoxville, on or about Oct. 15, according to officials in charge of the local mine-rescue station. First-aid, explosion demonstrations and athletic contests will feature the occasion. Elaborate preparations are being made, and it is expected that miners from all over the South will attend.

**Jellico**—After a day's conference at Jellico, the three Knoxville officers of the United Mine Workers of America and operators in the Jellico district agreed to postpone discussion of the wage scale until Sept. 18. It was stated that the miners officers are preparing a petition for presentation to the Tennessee Legislature at the next session requesting the removal of convicts from the mines of the state.

### KENTUCKY

**Barbourville**—Continued improvement in the coal industry is leading to a full resumption of operations in the southeastern Kentucky fields. In the event of a prolonged European war, local operators believe that they can supply a great part of the Eastern trade, which draws its present supply from the Eastern States.

**London**—The office and store building of the New Laurel Coal Co., at Pittsburg, Ky., two miles south of here; the office of Captain W. A. Pugh, coal operator, and other structures were destroyed recently by fire. The total loss is estimated at $10,000, only partly covered by insurance.

**Jenkins**—It is said the Consolidation Coal Co., in its Jenkins-McRoberts coal field, is making increases in its plants and will double its capacity within the next 30 days. Railroads—both the Louisville & Nashville and the Baltimore & Ohio—are taxed to their limit to handle the large tonnage. Additional trains will be added.

**Mater**—The Elkhorn Coal Co. will make increases in its plant here soon. One hundred extra miners will be put to work; 200 houses are under construction.

### OHIO

**Coshocton**—After a session covering two weeks, with frequent interludes for private conference, the joint meeting of Ohio miners and operators interested in the strike in this part of the field adjourned on the afternoon of Aug. 29 without having come to any settlement. A thousand miners will continue on strike in consequence, unless some means of ending the trouble is quickly arrived at.

**Congo**—Mine No. 301, at this place, which was badly damaged by fire on Oct. 31 of last year, has been inspected by representatives of the State Mining Department and found to be in shape for the resumption of work, as the fire has been completely smothered. It is expected that it will again be in operation by the middle of September.

### INDIANA

**Terre Haute**—Officials of the United States Bureau of Mines have been here arranging for the contests, Sept. 12, when teams and individuals will do first-aid and rescue work and the bureau will give demonstrations of explosions with its steel room. Teams are being entered from the Eastern fields, and following the contests a training school will be established in this city.

### ILLINOIS

**Peoria**—The Ubben Coal Co. is making arrangements for considerable improvements at its mine on the East Bluff. The installation of electric mining machinery will be one of the changes made, and the interior of the mine is to be lighted electrically.

**Danville**—Local coal operators recently received announcements of the National First-Aid and Rescue Meet to be held in Terre Haute, Ind., Sept. 12. The Bunsen Coal Co. will have teams entered from both the Westville and Universal (Indiana) districts, and it is believed that these contestants will make a creditable showing.

**Herrin**—The Roberts & Schaefer Co., of Chicago, which has the contract to rebuild the top works, recently destroyed by fire at Mine B of the Chicago & Carterville Coal Co., is breaking records in getting the property in shape for operation. It is expected that within 30 days from the time the contract was awarded, the property will be in shape to hoist coal.

**Marion**—The drouth in the southern Illinois mining fields was broken during the past week by several days of heavy rain. In many sections, this is the first rain since last May, and since as early as June, water has had to be hauled to several mines to keep them in operation. The supply is now abundant.

### MISSOURI

**Kansas City**—The district conferences that have been in session for several months have been concluded. Satisfactory settlements have been made in all districts where there have been dissensions between operators and miners, and all the mines are running full crews.

**Webb City**—For the first time, the mine-rescue car of the National Bureau of Mines, which heretofore has confined its demonstration and lecture work to coal-mining districts, has been sent to a metal-mining section. It is now stationed here, and will remain in this vicinity a month. Its presence is due to the activities of the Jasper County Anti-Tuberculosis Society, which was organized after attention had been called to the high death rate from tuberculosis in the mines. The car is later to be taken to Fort Smith, Ark.

### COLORADO

**Denver**—Thirty-five independent Colorado coal operators on Aug. 29 signed working agreements for the coming year with the district organization of the United Mine Workers of America. All these operators who have conducted their properties during the last few months under agreements with the Union renewed these agreements, the old contracts expiring Sept. 1. Two thousand men are employed in the independent coal mines.

**Hayden**—The Colorado-Utah Fuel Co. is sinking a large coal mine on what is known as the Wedge seam, in the middle series, and building a large camp, at Harris, near Hayden, Routt County, Colo., on the Denver & Salt Lake R.R. The vein at this point is slightly pitching and shows from 7 to 9 ft. of high-grade bituminous coal, and will be worked by a rock slope about 150 ft. long, which has recently reached the coal. Shipping is expected to begin in about 30 days, and in about a year to reach an output of 2000 tons per day.

### WYOMING

**Kemmerer**—Mine No. 6 of the Kemmerer Coal Co., which was shut down last Spring, has been reopened and will employ 150 men.

### MONTANA

**Lombard**—The Western Coal & Coke Co., owning a valuable coking coal property near Lombard, Mont., on the Northern Pacific Ry., is selling an issue of $150,000 of preferred stock for the purpose of opening a small mine and erecting a coal washer, small battery or byproduct coke ovens, probably of the Mueller type, a few dwelling houses and other equipment necesary for such a plant. Construction work is expected to begin in the early coming spring.

## FOREIGN NEWS

**Paris, France**—Refugees from Frameries, Belgium, declare that when the Germans occupied that town, they stopped all mine shafts and destroyed the machinery. Some go so far as to say that many miners were at work in the mines when the pit mouths were closed. This is, however, hardly probable.

## RECENT COAL AND COKE PATENTS

**Steam Boiler.** P. Jones, Wigan, Scotland. 1,089,476. Mar. 10, 1914. Filed Jan. 6, 1912. Serial No. 669,840.

**Miner's Lamp.** J. Van Liew, Chicago, Ill. 1,090,250. Mar. 17, 1914. Filed Apr. 29, 1913. Serial No. 764,310.

**Boiler.** L. D. Freeman, Pittsburg, Kan. 1,089,758. Mar. 10, 1914. Filed Feb. 17, 1913. Serial No. 748,930.

**Miner's Lamp.** J. Van Liew, Chicago, Ill. 1,090,250. Mar. 17, 1914. Filed Apr. 23, 1912. Serial No. 692,627.

**Coaling Device.** O. Bauerle, Sacramento, Calif. 1,090,012. Mar. 10, 1914. Filed July 9, 1913. Serial No. 778,141.

**Miner's Lamp.** P. Guilman, E. St. Louis, Ill. 1,090,051. Mar. 10, 1914. Filed Oct. 28, 1913. Serial No. 797,817.

**Furnace Grate.** J. Beck, Two Harbors, Minn. 1,090,014 Mar. 10, 1914. Filed Feb. 21, 1911. Serial No. 609,795.

**Smoke Conveyor.** C. F. Kellems, Holder, Ill. 1,090,071. Mar. 10, 1914. Filed May 23, 1913. Serial No. 769,505.

**Smoke Consumer.** L. Kidd, Bloomfield, Ind. 1,090,072. Mar. 10, 1914. Filed Jan. 31, 1913 Serial No. 745,511.

**Forced Draft Grate.** R. G. Long, Lawrence, Kan. 1,089,237. Mar. 3, 1914. Filed July 2, 1912. Serial No. 707,342.

**Mine Door.** J. K. Orr and L. F. Jones, Zeigler, Ill. 1,090,562. Mar. 17, 1914. Filed Apr. 7, 1910. Serial No. 554,008

**Water-tube Boiler.** A. F. Yarrow, Blanefield, Scotland, 1,101,606. June 30, 1914. Filed Jan. 20, 1912. Serial No. 672,494.

**Stoking Grate for Furnaces.** D. F. Nisbet, Grafton, Va. 1,088,445. Feb. 24, 1914. Filed Sept. 6, 1910. Serial No. 580,610.

**Mechanical Stoker.** F. M. Underwood, Hastings, Neb. 1,091,406. Mar. 24, 1914. Filed May 3, 1913. Serial No. 765,354.

**Smoke-Stack Protector** E. C. French and T. E. Craig, McKinney, Texas. 1,090,389. Mar. 17, 1914. Filed June 16, 1913. Serial No. 774,504.

**Apparatus for the Manufacture of Coal Gas.** R. C. Congdon, Atlanta, Ga. 1,090,813. Mar. 17, 1914. Filed Apr. 29, 1913. Serial No. 764,310.

**Steam Boiler Setting.** M. W. Sewall, assignor to Babcock & Wilcox Co., Bayonne, N. J. 1,090,947. Mar. 24, 1914. Filed May 27, 1912. Serial No. 699,861.

**Positive Cleaning and Self-Dumping Stoker.** R. S. Riley, Providence, R. I. 1,090,651. Mar. 17, 1914. Filed Aug. 31, 1912. Serial No. 718,606.

**Grate.** A. B. Coates, assignor to Economy Forced Draft Slack Burner Co., Elsworth, Kan., 1,102,139. June 30, 1914. Filed Apr. 15, 1913. Serial No. 761,378.

**Stack Cooler for Blast Furnaces.** L. L. Knox assignor to Keystone Bronze Co., Pittsburgh, Penn., 1,101,701. June 30, 1914. Filed Aug. 4, 1911. Serial No. 642,338.

**Apparatus for Regulating** the Air Supply for Gas Producers. H. L. Doherty, New York, N. Y., 1,101,787. June 30, 1914. Filed Feb. 15, 1910. Serial No. 544,097.

**Chain Grate Stoker.** J. H. Rosenthal and C. S. Davy, assignors to Babcock & Wilcox Co., Bayonne, N. J. 1,091,666. Mar. 24, 1914. Filed June 24, 1912. Serial No. 705,424.

**Apparatus for Discharging Ashes and Clinkers.** W. S. Parsons, assignor to J. Stone & Co., Deptford, England, 1,102,351. July 7, 1914. Filed Feb. 3, 1913. Serial No. 746,021.

**Firing Door Controlled Forced Draft Blower** for Steam Boiler Furnaces. E. R. Mulcahey, assignor to Draft Regulator Co., Providence, R. I. 1,090,820. Mar. 17, 1914. Filed Mar. 26, 1912. Serial No. 686,340.

## PUBLICATIONS RECEIVED

**The Canadian Mining Institute** Bulletin No. 24. One hundred and fifty-eight pages 6x9 in., illustrated.

**The Canadian Mining Institute** Bulletin No. 23. One hundred and three pages 6x9 in. illustrated.

**Department of the Interior,** U. S. Geological Survey. "The Production of Anthracite in 1913," by E. W. Parker. Sixteen pages, 6x9 in.; illustrated.

**Department of the Interior**—U. S. Geological Survey. "The Production of Peat in 1913," by Charles A. Davis. Nine pages, 6x9 in., unillustrated.

**Department of the Interior,** Bureau of Mines, Miners' Circular 12. "The Use and Care of Miners' Safety Lamps," by James W. Paul. Sixteen pages 6x9 in. illustrated.

**Department of the Interior,** Bureau of Mines. Technical Paper 66 "Mud-Laden Fluid Applied to Well Drilling," by J. A. Pollard and A. G. Heggem. Twenty one pages 6x9 in. illustrated.

**Department of the Interior,** Bureau of Mines, Technical Paper 58. "The Action of Acid Mine Water on the Insulation of Electric Conductors," by H. H. Clark and L. C. Ilsley. Twenty six pages 6x9 in.

**Department of the Interior,** Bureau of Mines, Technical Paper 56. "Notes on the Prevention of Dust and Gas Explosions in Coal Mines," by George S. Rice. Twenty-three pages 6x9 in., unillustrated.

**Department of the Interior**—Bureau of Mines, "Monthly Statement of Coal Mine Fatalities in the United States, May, 1914, with Revised Figures for Preceding Months." Compiled by Albert H. Fay. Sixteen pages, 6x9 in., unillustrated.

**Department of the Interior,** U. S. Geological Survey. "The Production of Gas, Coke, Tar and Ammonia at Gas Works and in Retort Coke Ovens and of Gas and Tar at Water-Gas Works in 1912," by Edward W. Parker. Thirty-two pages 6x9 in. with numerous tables.

## PERSONALS

Edward H. Coxe, of La Folette, Tenn., has just returned from a three weeks' trip to Denver and the Routt County coal fields.

Samuel D. Weakley has been retained by the Alabama Coal Operators' Association to conduct the resistance to the plan of the railroads to make an increase in local coal rates.

W. T. Brown, of Ragland, Ala., has reopened his mines at Taits Gap, the same having been closed down for more than a year. Extensive improvements have just been completed.

Sam Davis, the well known Toledo coal dealer, has a force of men at work on what it is said will be when completed the largest coal yards in Ohio. The initial outlay on the new coal yards will be $30,000.

Kenneth U. Meguire, of Louisville, Ky., president of the Harlan Coal Co. and of the Snead-Meguire Coal Co., recently went to Fairmount, W. Va., to play golf with George T. and James O. Watson in the tournament in which the three coal men are all entered.

George G. Yeomans, formerly assistant to President Delano, of the Wabash R.R. Co., has been elected president of the Monon Coal Co., of Indiana, with headquarters in the Old Colony Building, Chicago. This position was recently vacated by Harry N. Taylor, of Chicago.

William McLaughlin, of Huntington, Ark., was recently elected president, succeeding Peter R. Steward, of McAllister, Okla., resigned, of the United Mine Workers of America of Oklahoma, Arkansas and Texas. Thomas L. King, of Fort Smith, Ark., was elected vice-president.

Thomas E. Byrnes, of St. Louis, Mo., for several years with the Franklin Coal & Coke Co., and the Bickett Coal & Coke Co., and formerly superintendent of transportation of the Missouri Pacific-Iron Mountain Lines, entered the coal business for himself on Sept. 1, with offices in the Wright Building.

John Britt, chief of the mine clerks of the Pittsburgh Coal Co., of Pittsburgh, Penn., has retired from that organization to become identified with the Berwind-White Coal Mining Co., at Windber, Penn., as auditor of the latter company. Mr. Britt has been succeeded by W. C. Fife, of the operating department of the Pittsburgh Coal Co.

Colonel Harvey M. La Follette, formerly president of the La Follette Coal, Iron & Ry. Co., returned last week to La Follette, Tenn., after a protracted absence in New York, where he has been working on a plan to reorganize the above mentioned company, now in the hands of a receiver. After remaining in La Follette a few days, he returned to New York to again take up his reorganization work.

## OBITUARY

Thomas B. Heims, formerly a bituminous coal operator at Osceola Mills, Penn., died recently at his home in Philadelphia. He was 64 years of age and retired from business three years ago.

W. C. Lovejoy, aged 36 years, a well known coal man of Birmingham, secretary of the Canal-Export Coal Co., committed suicide at St. Vincent's Hospital, Birmingham, on Aug. 25. Ill health is said to have been the cause.

John Ralston, 84 years old, a pioneer operator of the Middlesboro, Ky., district, and the first inspector sent into this section by the English syndicate, died recently at his home here. Mr. Ralston came from the Pennsylvania coal district 30 years ago, and since then he and his sons have been important factors in the development of the industry in this part of Kentucky.

William Thomas Lewis, first Baron Merthyr of Seughenydd County, Glamorgan, died in London, Aug. 26, at the age of 77 years. He was one of the largest coal mine owners and operators in Wales. He served many years on royal commissions on matters connected with coal mining, trade disputes and various labor questions. He was president of the University College of South Wales and Monmouthshire, formerly president of the South Wales Institute of Engineers, the Mining Association of Great Britain and the Institute of Mining Engineers; vice-president of the Iron and Steel Institute and the Institute of Mechanical Engineers, and chairman of the Monmouth and South Wales Board of Examinations for mining certificates.

## CONSTRUCTION NEWS

**Philadelphia, Penn.**—The Lehigh Valley Coal Co. is making extensive repairs to its big breaker at Beaver Meadow.

**Yolande, Ala.**—The Yolande Coal & Coke Co. will spend about $30,000 on improvements at Yolande and Abernant mines.

**Kittanning, Penn.**—The Allegheny River Mining Co. is opening a new mine on the Allegheny River, at Kittanning. This will be known as the Nicholson Run mine.

**Euclid, Penn.**—The Euclid Coal Co. is opening a coal mine on a 100-acre tract at Euclid station, near New Castle, Penn.. A coal tipple, sidings and a large number of houses for the miners' families will be erected before the winter sets in.

**Cincinnati, Ohio**—Contracts for the construction of two bridges across the Tug River and two miles of railroad up

Blackberry Creek have been awarded to Boxley, Haley & Co., of Roanoke, Va., by the Norfolk & Western Railway Co., at a cost of $125,000. The construction of this road will add greatly to the coal traffic of the Norfolk & Western, and opens one of the greatest coal territories in eastern Kentucky.

**Johnstown, Penn.**—The Savan Coal Co., owner of what is known as the Lawry coal tract, near Deckers Point, Indiana County, is pushing work on the railroad from the B. R. & P. Ry. at Savan to the opening, a distance of about two miles, and hopes to be ready to ship coal in the near future. Work on this road was commenced last summer, but was not completed.

**Nashville, Tenn.**—The Nashville, Chattanooga & St. Louis Ry. has just authorized the erection of a modern steel coaling plant at Hollow Rock Junction, on the Paducah & Memphis Division, and is prepared to expend between $15,000 and $20,000 in this work. The purpose of this coaling station is to take care of the locomotives in this territory as far as Paducah, Ky., also portions of the Nashville Division.

**Windber, Penn.**—M. E. McNeal is pushing his mining project near Cairnbrook. The tipple and scales are up, the mine is turning out coal, and the railroad line from the mine over the turn of the mountain into Bedford County is being pushed. It will probably be two months before this line is completed over the crest of the hill.

## NEW INCORPORATIONS

**St. Louis, Mo.**—Davis Creek Coal Co., of St. Louis, has been incorporated with a capital of $75,000 by L. L. Brande, J. L. Rowland and J. J. Wells.

**Woodsfield, Ohio**—The Cambria-Stafford Coal Co. has been incorporated at Woodsfield, Ohio, with a capital stock of $10,000. It will deal in coal lands.

**Harrisburg, Ill.**—The Oliphant-Wasson Coal Co. has been incorporated here with a capital of $250,000, by C. M. Wasson, G. T. Gaskins and J. T. Gaskins.

**Kansas City, Mo.**—The Bruce-Cherokee Coal Co. has been organized, with a capital of $2000. The incorporators are J. B. Bruce, M. W. Coulson and V. W. Bruce.

**Richmond, Va.**—The Himyar Coal Corporation, of Richmond, Va., is increasing its capital stock from $50,000 to $75,000, and changing the common stock from $25,000 to $50,000.

**Pittsburgh, Penn.**—Announcement has been made of the increase in the capital stock of the Pittsburgh Coal Washer Co. from $12,000 to $50,000. O. J. Tope is treasurer of the company, with offices in the Fulton Building, Pittsburgh, Penn.

**Roanoke, Va.**—The Carrs Fork Coal Land Co. has been incorporated, with a maximum capital stock of $100,000 and a minimum of $10,000. J. B. Fishburn is vice-president; B. B. Hull, Jr., treasurer, and Leon Neal is secretary, all of Roanoke.

**Jackson, Ohio**—The Ohio & Indiana Collieries Co has been organized, with a capital stock of $150,000, to deal in real estate, coal, iron and other minerals. The incorporators are E. E. Morgan, Walter McCloud, David Armstrong, M. J. Jones and E. E. Eubanks.

**Fairmont, W. Va.**—The Liberty Coal Co. has been incorporated with an authorized capital of $2,000,000. The incorporators are Josiah V. Thompson, Robert Howell and H. A. Hibbs, of Uniontown, Penn.; Herman M. Kephart, of Connellsville, Penn., and William H. Burns, of Fayette City, Penn.

**St. Louis, Mo.**—The Davis Creek Coal Co. has been organized with a capital stock, fully paid, of $75,000. The purpose of the company will be to operate coal mines, buy and sell coal, also to generate and sell electric light and power. The incorporators are J. J. Wells, J. L. Rowland, L. L. Brande, Edwin H. Conrades and R. E. Rombauer.

## INDUSTRIAL NEWS

**Philadelphia, Penn.**—The bituminous tonnage of the Reading Ry. for June, 1914, was 1,230,022 tons ,as compared with 1,293,971 tons for June of 1913.

**Connellsville, Penn.**—Through a petition recently filed, the Peabody Coal & Coke Co. asked the court to grant it a decree of dissolution. The petition merely set forth that the company has at present neither assets nor liabilities, and that it has been deemed expedient to take this procedure.

**Fayette, W. Va.**—The heavy coal loadings thus far in the West Virginia and Kentucky fields have led officials of the Chesapeake & Ohio R.R. to feel assured that the coal-loading record of the road will be broken.

**New York City**—G. A. Kreutzburg, president of the Wolf Safety Lamp Co., is making arrangements to have the Wolf lamps manufactured in this country, in case European hostilities cut off the supply from Germany for any considerable period of time.

**Duluth, Minn.**—While Duluth coal men are not hesitating to urge customers to buy fuel early, they place no faith in the report of a probable coal shortage. There are more than 8,000,000 tons of coal stored at the Duluth-Superior docks, according to accurate estimates.

**Olympia, Wash.**—The Public Service Commission recently announced its decision to order into effect the reduced rates on coal shipments from Roslyn to all points named in the recent tentative order. The final order in the case will probably become effective in a few days.

**Manchester, Ky.**—One of the biggest timber and coal land deals that have been made in this region for some time is being consummated in Clay County. Scranton, Penn., parties have purchased some 40,000 acres of the finest coal and forest land to be found in the Kentucky mountains.

**Mobile, Ark.**—A voluntary petition in bankruptcy was recently filed in the United States District Court by the Markley Coal Co., a corporation of Mobile, declaring its assets to be nothing and its liabilities $46,777. This company was connected with the well known Markley-Miller operations.

**Ketchikan, Alaska**—Coal en route to this port on board the Canadian Pacific freight steamer 'Princess Ena," and consigned to the Northland Dock Co., of Ketchikan, was seized by the British Government at Prince Rupert recently, and loaded there on board the Canadian cruiser "Rainbow."

**Chicago, Ill.**—A substantial increase in the coal tonnage of the Central Freight Association territory accounts for the decerase of 24,738 cars in the surplus freight cars on railroads reporting to this association. On Aug. 15, there were 174,260 cars, of which 75,272 were box, 7189 flat, 56,560 coal and gondola and 35,259 of other kinds.

**Halifax, N. S.**—The Nova Scotia Government recently sent a message to His Royal Highness, the Duke of Connaught, that Nova Scotia would be glad to deliver 100,000 tons of coal for such purpose as would best serve the interest of the Empire at the present time. Landed at Halifax, this coal tonnage would be worth approximately a half million dollars.

**Thurmond, W. Va.**—The west end of the Chesapeake & Ohio R.R. bridge over the New River, at this place, was badly damaged a few days ago, when a yard engine derailed two 70-ton steel coal cars on the bridge The structure was temporarily repaired so that empties can be handled over it, but until other repairs are made, loaded cars will be handled by way of Sewell, over the Southside branch.

**Pittsburgh, Penn.**—Pittsburg coal operators are preparing to resume more activity in mining in the immediate future than at any time this year. During the summer, not more than 35 per cent. of the mining capacity has been employed, owing to the congestion of coal on Northwestern storage docks. Recently, reports have come that the railroads are commencing to move the stock coal in the Northwest in empty grain cars brought to the Lake ports from the West.

**Birmingham, Ala.**—Alabama coal operators are greatly interested in the announcement from South America that unless the railroads there receive a supply of coal before long, they will have to cease operations. Chile has an inquiry in for 300,000 tons of Alabama coal. As soon as banking arrangements have been perfected, the business will be handled by operators in this district. Ships to handle the coal are already promised through the port at Pensacola. This order will be followed by others, and shipments when once started are to be steady and of large tonnage.

**Johnstown, Penn.**—The Graff interests recently purchased several thousand acres of coal and coal land in Loyalhanna and Salem Townships, Westmoreland County. These tracts lie about a mile south of Salisburg and five miles north of Andrico. It is confidently believed that the Crabtree Branch of the Pennsylvania R.R. will be extended from Andrico to Saltsburg, where it will connect with the West Penn. The building of this railroad will not only open up a big section of coal land for development, but would give residents of the Kiski Valley direct railroad communication with Greensburg.

# Coal Trade Reviews

## General Review

**Anthracite slows down to a more conservative basis. Much of the West Virginia high-grade bituminous fuels now out of the market. Large contract closed with the Italian Government. Internal business adversely affected by slow industrial conditions.**

The heavy anthracite demand of the past few weeks has slowed up to a certain extent, although the market is still active. The Western trade, which anticipated a shortage when the European war developed to such large proportions, started an active buying movement that culminated last week in a situation resembling mid-winter activity. Although still strong, there is a possibility of a relapse before the actual fall business opens up in full blast. All the prepared grades are in good demand at the full circular, with the possible exception of egg.

A large contract business is noted in the Atlantic coastwise trade, particularly as regards the Pocahontas and New River fuels; a big volume of these is either under option or already disposed of, and there are persistent rumors of an impending shortage. As regards the Pennsylvania coals, in the export trade, there seems to be little possibility of these becoming a feature in that business until the West Virginias advance to at least $3.25, or 50c. above the prevailing level. One of the most important developments of the week was the closing of a contract for 350,000 tons for the Italian Government.

The ordinary consumption seems to be reduced to a minimum, and there is scarcely any spot demand at all. On the other hand, shipments to tidewater are heavily restricted and reports indicate that supplies are even lower than usual, while there is a firmness to quotations that is strongly indicative of higher prices later.

In Canada, there are many reports of large transactions at profitable figures, when, as a matter of fact, the regular circular is being maintained with great difficulty; buying is erratic and fluctuating to both extremes. The Ohio market is suffering from the general business depression, steam consumption being light and little money in circulation. The domestic situation is improving, however, and prices are steady at the full circular.

The Southern market reports export inquiries from South America aggregating half a million tons; the business is competitive with West Virginia operators, and the local companies are making a strong effort to secure it. At present, it seems to hinge largely on the question of charters.

Contradictory conditions prevail in the Middle Western trade, substantial advances on the one hand being offset by like recessions on the other. As a rule, the demand seems to be improving as the fall season approaches, and the situation is expected to be materially improved by the close of the current month. The steam market continues the weak department, the restriction in industrial operations having curtailed the demand for these grades.

## ATLANTIC SEABOARD

### BOSTON

**Large volume of Pocahontas and New River sold for export; a shortage expected for coastwise shipment. Pennsylvania grades in strong position and a comprehensive business expected. Georges Creek also in demand off-shore. Anthracite trade good and plenty of orders on hand for September.**

**Bituminous**—Things in Pocahontas and New River have developed sufficiently the past week to cause some uneasiness among New England buyers. Most of the agencies have little coal available at Hampton Roads for September and October, so a large volume is either under option or actually sold for loading off-shore. There is a considerable demand from Mediterranean points and from other directions there is already inquiry for coal that will be mined 60 and 90 days hence.

**Coastwise,** the movement is still confined to contract business, and while prices have not advanced either f.o.b. or on cars there is a notable firmness that seems to forecast higher prices later. There are practically no cargoes offering on the market, but on the other hand no spot demand of any account has yet developed here.

**The Pennsylvania** grades continue in a strong position and conditions improve almost daily. Both all-rail and at tide, coal is in better request even than last week and several of the larger shippers are laying plans to handle a comprehensive business this fall. The mines are on better time and no doubt something will be heard on prices before long. Shippers are watching the export market closely and it is more than likely that there will be something of a tonnage to be loaded at Philadelphia for foreign points.

**Georges Creek** receivers here are beginning to worry over the outlook for sufficient supplies of that grade. Already foreign steamers are being given preference in loading, coal being held for them while coastwise boats wait, and it will not be surprising if New England again runs short of this popular grade. Unquestionably, the shippers are much interested in the off-shore market, with an eye to business in the future, "after the war."

**In Water Freights** there has been no special development since last reports. Rates are firm but a further advance has not materialized so far.

**Anthracite**—An unexpectedly heavy demand came on the last of August and practically all the companies are carrying orders over into September. The retailers are beginning to be swamped with orders and they are, in turn, ordering coal freely of the shippers. Stove is expected to be in even shorter supply in a few weeks.

Quotations on bituminous at wholesale are about as follows:

| | Clearfields | Cambrias Somersets | Georges Creek | Pocahontas New River |
|---|---|---|---|---|
| Mines* | $0.90@1.50 | $1 25@1.70 | $1.67@1.77 | |
| Philadelphia* | 2.15@2.75 | 2.70@2 95 | 2.92@3.02 | |
| New York* | 2.45@3.05 | 2.80@3.25 | 3.22@3.32 | |
| Baltimore* | | | 2.85@2.95 | |
| Hampton Roads* | | | | $2.85@2.95 |
| Boston† | | | | 3.68@3.83 |
| Providence† | | | | 3.60@3.68 |

* F.o.b. †On cars.

### NEW YORK

**Uncertainties still predominate the bituminous market, though the outlook is favorable. Italian contract for 350,000 tons closed. Anthracite slows down to a more conservative basis. Operations in the mining regions still heavy.**

**Bituminous**—Aside from the active inquiry in export business, which is culminating in an occasional order, the local bituminous situation continues slow. The abnormal conditions prevailing as a result of the European wars, has caused many uncertainties in the business situation here. Some branches of manufacturing are benefited while others have been compelled to curtail or close down completely with the result that the coal consumption is fluctuating widely.

One of the most important developments of the week in export circles was the closing of a contract by the Davis Collieries Co. for 350,000 tons of coal for the Italian Government, shipment to be made in Italian bottoms. While no details are available this is probably for West Virginia coal. It is not generally believed that the Pennsylvania fuels will be able to break into the export business until Hampton Roads prices touch $3.25 to $3.50 or 50 to 75c. above the ruling level.

The situation at Tidewater is considered quite favorable at the moment. Business is slow and orders rather light, but there is no coal of any description reported on demurrage; on the contrary supplies are reported rather short. The movement on the Pennsylvania R.R. is delayed and considerable coal is reported blocked around Altoona. Mines as a rule are working good and prices are steady though at the relatively low level prevailing for the past few weeks as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

**Anthracite**—There has been a conservative slowing down in the hard coal business though the situation is still active. With the gradual development of the war situation, the early

part of last month, anthracite consumers, particularly in the West, began to anticipate a shortage, with the result that by the middle of the month a heavy buying movement developed attaining almost mid-winter proportions. It was purely a psychological condition, but it was instrumental in moving a great deal of coal.

All of the prepared grades are still firm with the possible exception of egg coal which is still occasionally offered at cut prices. The heavy demand for stove coal in all directions has helped materially to move the surplus accumulations of egg and nut coal at the full circular. Pea is growing in demand. In the steam fuels there is little of the individual high-grade varieties offered at cut prices; concessions are still heard on the lower grades though the market is not by any means flooded.

The line trade continues the leader, the Western demand for nut coal being unusually heavy, and the Canadian call for stove and nut being accentuated by the European wars. This may be taken as an indication that there will not be any surplus coal at Tidewater this fall.

Practically all the mines are working on full schedule, and a very active situation is anticipated when the winter demand opens up. The local market is now quotable on the following basis with the new September circular in effect:

| | Upper Ports | | Lower Ports | |
|---|---|---|---|---|
| | Circular | Individual | Circular | Individual |
| Broken | $5.10 | $4.60@5.10 | $5.05 | $4.55@5.10 |
| Egg | 5.35 | 5.10@5.35 | 5.30 | 4.95@5.30 |
| Stove | 5.35 | 5.35 | 5.30 | 5.30 |
| Chestnut | 5.60 | 5.50@5.60 | 5.55 | 5.35@5.55 |
| Pea | 3.55 | 3.45@3.55 | 3.50 | 3.20@3.50 |
| Buckwheat | 2.80 | 2.75@2.80 | 2.50@2.75 | 2.10@2.75 |
| Rice | 2.30 | 2.30 | 2.00@2.25 | 1.60@2.25 |
| Barley | 1.80 | 1.75@1.80 | 1.75 | 1.30@1.75 |

### PHILADELPHIA

**Better tone to anthracite market. Local conditions improving, and increased operations at mines. Little change in the bituminous situation, but trade looks for gradual improvement.**

**Anthracite**—There is no doubt but what the situation shows a marked improvement. Line and local operators state that they are receiving many inquiries, and the retail dealers report that coal of all sizes is commencing to move. The return of house holders and the almost universal idea that coal is likely to be short the coming winter, is having its effect, and more coal wagons are seen on the streets than has been the case for a couple of months. Most of the dealers are well stocked, however, many of them carrying over considerable coal from the spring months, and it will possibly be a couple of weeks before they begin taking on additional supplies in appreciable quantities. In the meantime, the individual operators still stand ready to fill any gaps at less than circular.

It seems the concensus of opinion in the trade, that the demand will not only come early, but continue particularly strong throughout the winter months, and the dealers are laying their plans accordingly. Outside of chestnut and pea coal, which need the stimulus of a low price to move, the trade is absorbing practically all sizes. Operations at the mines were continued last week at five days, and it is understood that this program is likely to be followed until the market can absorb the full weekly output.

Prices at Tidewater rule about as follows:

| | Circular | Individual |
|---|---|---|
| Broken | $4.75 | $4.75 |
| Egg | 5.00 | 5.00 |
| Stove | 5.00 | 5.00 |
| Chestnut | 5.25 | 4.90 @ 5.00 |

**Bituminous**—There seems to be better feeling in the bituminous trade. While mining still continues under a curtailed basis, many operators seem to have optimistic opinions regarding the near future. This is indicated by the almost general attitude of the trade on future business; spot coal is anywhere from 25 to 30c. less than a quotation for future delivery, which certainly spells better conditions to come.

### BALTIMORE

**Interest centered on export possibilities. Local conditions remain flat, but big change is looked for in the near future. Surplus at tide disappearing.**

With home conditions slow it is natural that the eyes of the coal trade should be turned toward the new possibilities in the export business. From every quarter of the globe come inquiries for fuels to take the place of Welsh coals that have been withdrawn as a result of the European war. A number of contracts have been closed on these advances already, and a great field is opening up. This call is for the better grade coals.

Industrial conditions are so poor for the present that there is little doing here for domestic consumption. Cheap fuel is offering freely at the mines. West Virginia gas three-quarter was selling to the trade as low as $5 in places; steam coals are around 95c. In the Pennsylvania regions the medium to poor grades are selling at from $1 to 1.10. First grade coals are showing a little inclination to stiffen, and are selling from $1.25 to $1.35.

Under the growing export movement of both coal and grain, which requires cargo and bunker coal, the big surplus at tide is fast disappearing. Some unexpected coal loadings for Norway and Greece the past week took care of part of the free coal at tide. Charter rates to foreign ports are abnormally high but more bottoms are offering now that Britain and France are in control of the sea. Coastwise bottoms are offering easily and there is little or no change of rate to be noted.

**Anthracite** men report a little better inquiry. No general awakening is predicted for less than three weeks or a month, however.

### HAMPTON ROADS

**Export shipments continue heavy. Rumors of sales negotiated at prices above circular. Government transports taking considerable bunker fuel at Newport News.**

Shipments from tidewater during the week have been heavy. This is especially true as regards export movement, although coastwise shipments have also shown up well. The demand for all grades shipped from Hampton Roads still continues good, although it is reported that some large lots have been sold at prices above circular it is difficult to get this confirmed.

The market is full of inquiries from various foreign countries. It is understood that about 100,000 tons has been sold to parties in Greece and that this coal will begin to move during the next few days. Export shipments have been made to Havana, Cardenas, St. Lucia, Callao, Para, Bahia Blanca, Rio, Buenos Aires, Manaos, Kingston, Genoa, Naples and Lisbon. There has also been a small movement via schooner to San Juan, Porto Rico.

The United States Government has taken considerable coal at Newport News for transports which are due shortly to sail for European ports.

Both Sewalls Point and Newport News at this writing are within a few thousand tons of the August, 1913, dumpings and unless tonnage due fails to arrive during the next two days the total of these two roads for August, 1914, will be in excess of last year. Lamberts Point figures are not obtainable at this moment.

### COAL CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

| Vessel | Nationality | From | To | Tons | Rate |
|---|---|---|---|---|---|
| Standish Hall[2] | British | Virginia | Rio Janeiro | 2544 | |
| Haxby[2] | British | Baltimore | Genoa | 2252 | |
| Warren Adams[1] | | Philadelphia | Charleston | 587 | |
| Kate B. Ogden[1] | | Philadelphia | Charlottetown, P.E.I. | 541 | $1.60 |
| Georgina Roop[1] | British | Philadelphia | St. John, N.B. | 423 | 1.50 |
| Ramazan[2] | British | Norfolk | Rio Janeiro | 2211 | 5.40 |
| Edison Light[2] | American | Philadelphia | Rio Janeiro | 1699 | |
| Brattingsborg[2] | Danish | Virginia | River Plate | 1963 | 4.80 |
| Edith[1] | | Baltimore | San Juan, Porto Rico | 1051 | |

[1] Schooner [2] Steamer

## LAKE MARKETS

### BUFFALO

**Conditions mixed in both anthracite and bituminous. Situation not greatly affected by war except in Canada. Home consumption less than normal. Better demand anticipated.**

**Bituminous**—As a rule it is held that the war is going to help this country, but a period of depression is expected before the benefit is felt and it is a question how long that will last. There is a report from Pittsburgh that the war has not improved the export trade at all and there is no prospect of orders on that score. Home business has been injured by it so that the coal business so far has only sustained a loss. Canada has lately bought considerably more coal than it has used but this is no real advantage, as the time will come when that coal must be used and buying will cease. There is evidence that Canadians are much more puzzled over the outlook than is the case with us. Buying is erratic, fluctuating to both extremes. On this account the jobber and shippers hardly know what to do. A Buffalo salesman is just back from a visit to Montreal with the report that there is an over-supply on hand now.

There are many false reports of transactions. Some members of the trade appear to think that every unusual order placed is for use in the war somewhere. There is no change in the semi-official circular. Much of the poorer coal

sells for less but prices continue nominally as follows: $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, the different sizes being fairly on a level as to strength. Allegheny Valley slack is about on a par with Pittsburgh, but sizes are 15 to 25c. lower.

**Anthracite**—The demand is improving, though neither shippers nor local dealers are sure that the stir is the beginning of the fall rush. Practically all sizes are asked for. Canada has bought so much of late that it will probably drop out when other sections start buying. The big apple crop has created a demand for grate, which is used in the apple evaporators. The independent dealers get a large part of this trade.

There is a good amount of anthracite moving out by Lake, but the rush of June and July cannot be kept up. There is getting to be a very large amount on the Upper-Lake docks and till it begins to sell there will be light shipments. The amount loaded during the week, as recorded by the custom house was 78,000 tons.

### TORONTO

**Usual fall increases begin earlier than customary. Still considerable stocking.**

The usual fall increase in the price of anthracite occurred this season a little earlier than usual. There is a heavy demand for domestic purposes and dealers are very busy making deliveries, many consumers laying in stocks in anticipation of a possible embargo on coal by the United States. The call for steam coal is steady and prices somewhat higher, quotations being as follows: Retail—anthracite, egg, stove and nut $7.75, grate, $7.50, pea $6.50; bituminous, steam, $5.25; screenings $4.35, domestic lump, $6, cannel, $7.50, wholesale f.o.b. cars three-quarter lump, $3.83, screenings $2.89.

### TOLEDO

**Lake shipping much stronger and considerable coal going to Canada. Some predict stronger prices shortly. The domestic market a little better.**

The domestic market is showing considerable strength in these quarters. The steam trade continues light due to the fact that Toledo factories are for the most part only running at about two-thirds capacity. Money is tight and this has a depressing effect on business generally.

Lake shipping is more active than it has been for months and a great deal of coal is going into Canada although dealers do not have much to say about this feature of the business. Some of the railroads are ordering new equipment but it is generally conceded that should there be a very heavy grain movement there will be a severe car shortage. However, farmers are strongly inclined to hold their products in the hope of securing war prices and this may save the day so far as the traffic situation is concerned. There is no change in quotations as yet although higher prices are predicted for domestic grades.

### CINCINNATI

**Domestic grades slowly improving, strengthened by the foreign demand and the customary increase in local orders. Steam business remains slow, industiral concerns operating on short time.**

The situation is more nearly normal, save for the general slackness which has marked the whole year. Returning domestic consumers are making arrangements for their winter fuel, bringing the retail trade better business than it has had for some time, although nothing like the usual volume is yet in evidence; this is being reflected to a certain extent in the demand at the mines. Many dealers are so fully stocked that they appear determined to wait still longer before ordering new supplies in any quantities, but in spite of this fact, the domestic market is in better shape than for some time. Prices are steady at circular, with the possibility of premiums by no means remote.

In the steam market there has been more of a decrease than an increase in the demand. The sluggishness is due to dullness in the numerous industries whose operations normally call for a large consumption of fuel, somewhat emphasized by cancellation of orders from Europe. The expected stimulation, due to increased demand from other markets, has not materialized as yet and many lines of business are running on much slower time than before. The general feeling, however, is optimistic.

On the whole the situation is much improved. Transportation facilities are excellent, and the Lake movement continues steady, although relatively light in volume. There is very reason to believe that production and consumption will be about normal from now on, with prices at a profitable level.

### DETROIT

**Domestic grades fairly strong and some stocking is noted. Favorable outlook in anthracite.**

**Bituminous**—The steam trade is slow, as is naturally to be expected with industrial conditions generally at such a low ebb. There is a noticeable leaning toward the open market among consumers, and contracts are still slow in being closed up. The domestic grades are the strongest at the moment. The stocking-up season is opening up briskly, particularly on the West Virginia grades, with Hocking Valley also in good demand. The West Virginia splint lump-coal is quoted at $1.60, three-quarter lump at $1.25, Pocahontas lump at $2.50, with mine-run at $1.50, and Hocking lump at $1.60. A general increase on nearly all the grades is scheduled for the near future.

**Anthracite**—Should the European war result in diverting much of the smokeless coal into the export market, the local anthracite situation will be much benefited. The West Virginia smokeless fuels have made heavy inroads in the local hard-coal market in recent years, and in the event of a shortage of these, the anthracite jobbers will regain much of their lost ground.

## COKE

### BUFFALO

Coke shippers are unable to see any improvement in the demand. The movement of iron ore is fairly brisk, some local furnaces not having much of a supply, though the receipts are good. This apparent contradiction may mean that someone is storing up ore for future activity, but at the same time they do not try to take advantage of the coke market. Quotations remain on the basis of $4.25 for best 72-hr. Connellsville foundry, with stock coke $3.25.

### DETROIT

The demand is increasing, while shipments are coming in rather slowly, with the result that the high-grade cokes are commanding a slight premium. Connellsville 72-hr. foundry is quoted at $3.75, and Solvay at $4, with gas house at $3.50, all f.o.b. ovens. Connellsville retails at $6.50 per ton and Solvay at $6, although it will probably advance to $6.50 by the middle of the current month.

### ST. LOUIS

A small amount of byproduct domestic coke is moving in, and in the past week a fairly good tonnage of foundry coke passed through St. Louis. The local demand is light. Local gas house coke for domestic use is in good demand.

## SOUTHERN

### LOUISVILLE

**Increased demand for domestic coals and mines are working stronger. New September circular in effect.**

The quickened demand for domestic coal continues the significant thing in the Kentucky market at the moment; steam coals are in no worse condition than they have been for a considerable time. Generally the mines are rather active, working nearly to capacity. September prices, an increase of from 5 to 10c. all along the line, are now in effect.

The market has hardly become adjusted yet to the new conditions occasioned by the war in Europe though that influence is expected ultimately to prove beneficial.

### BIRMINGHAM

**European war promises renewed activity in South American trade. Lump coal in slightly better condition and blacksmith grade satisfactory.**

The local demand for steam coal is just about the same though slightly heavier for immediate shipment. However, the European war is causing a shortage of coal in South America and Alabama operators have been asked to make prices on several large tonnages, one of 200,000 tons for the Argentine Republic and another of 300,000 tons for the Chilean navy. While it is not an assured fact that this district will get these orders it seems reasonable to believe it will. The United States is now the only country which can supply it, and the operators in this district are making a very strong effort to land it. The main obstacle so far seems to be in obtaining charters to convey the coal. The matter is now being vigorously pushed and results are expected shortly. Birmingham capitalists are also talking of organizing a steamship line for this business, but the matter is being held up until definite information is obtained as to whether necessary ships can be chartered. In addition to these two inquiries, Uruguay and Sweden have also asked for prices.

# MIDDLE WESTERN

## INDIANAPOLIS

**Demand for domestic grades improves slightly and will increase as the month advances, operators predict. Prices are also expected to improve, with the fall demand and the running schedule to increase. Industrial demand slackening, due to war. Retail trade handicapped by closeness of money.**

The demand for domestic coal keeps improving a little and will grow as September advances; it takes cool weather to put the householder in buying mood. Mines already have a fair number of contracts for September delivery and operations will likely be increased. That there was a little spurt in August is indicated by the fact that the last semi-monthly pay in the Clinton field was the largest of the summer season.

Trade has since fallen off, however, and in some districts is said to be the lightest for five months. The demand for steam coal is apparently below normal, affected by the slackening up of industrial operations on account of the war. Even factories that have no export trade are affected. Prices remain unchanged but operators seem to be of opinion that they will be higher shortly. Retailers say the financial stringency and industrial situation has prevented considerable stocking of winter coal. With money tight, consumers hang on to every dollar until they have to part with it. Mines are operating on about half-time.

## ST. LOUIS

**An increasing demand for the larger sizes of domestic coal from the high grade fields. Steam market demoralized.**

Franklin and Williamson County lump and egg coal have advanced as much as 25 to 40c. a ton. This is caused largely by the fact that there has been little early buying, and business that has usually been placed in June and July is now coming in. To off-set this, several of the large manufacturing plants are running on half time, and some of them have shut down entirely, so that the future is not the brightest. Car shortage is causing the railroads to refuse to give the mines any cars for the larger sizes as long as they have unbilled steam sizes on track. In the Franklin County field during the past week as many as 90 cars of steam coal have been unbilled by one company.

In the Standard market, while the demand for domestic sizes still continues, yet there is an apparent fear on the part of the operators that if they ask more money the demand will cease: 2-in. screenings are selling at from 30 to 40c., but the price of 2-in. lump is still hovering around 90c. to $1, the last being considered a good price.

There has been an unusual demand and exceptionally good movement of Pennsylvania anthracite in the past ten days. Smokeless is absolutely a drug on the market, with no demand. Arkansas anthracite is picking up some.

| | Williamson and Franklin Co. | Big Muddy | Mt. Olive | Standard | Sparta |
|---|---|---|---|---|---|
| 2-in. lump | ..... | .... | $1.25 | $0.90@1.00 | $1.10 |
| 3-in. lump | ..... | .... | 1.30 | .... | ..... |
| 6-in. lump | $1.50@1.75 | .... | 1.40 | 1.10@1.20 | 1.25 |
| Lump and egg | 1.85@2.15 | $2.25 | ..... | .... | 1.15 |
| No. 1 nut | 1.25@1.50 | .... | ..... | .... | ..... |
| Screenings | 0.70@0.75 | .... | 0.80@0.85 | 0.30@0.35 | 0.35 |
| Mine-run | 1.00@1.15 | .... | ..... | 0.75@0.80 | ..... |
| No. 1 washed nut | 1.50@1.60 | 2.25 | 1.50 | .... | ..... |
| No. 2 washed nut | 1.25@1.35 | .... | 1.35 | .... | ..... |
| No. 3 washed nut | 1.15@1.20 | .... | ..... | .... | ..... |
| No. 4 washed nut | 1.00@1.10 | .... | ..... | .... | ..... |
| No. 5 washed nut | 0.55@0.65 | .... | ..... | .... | ..... |

September prices on Pennsylvania anthracite are: Chestnut, $7.50; egg and stove, $7.30; grate, $7.05. Arkansas grate, egg and chestnut is $6.10 and lump $5.85.

## KANSAS CITY

**Trade continues to improve, though householders are slow in placing orders. Light wholesale trade is offset by bright prospects later.**

A cool spell last week helped somewhat to stimulate interest in coal orders, suggesting the nearness of winter. The approach of September and possible higher retail prices did not create the usual rush orders on the last days. Wholesale dealers and mining companies complain that business is not up to the standard for the season, but they are all hoping for a large increase soon.

Kansas City sentiment in reference to the effects of the war is growing more sanguine, and there is a tendency to reach out for the big trade that America may get from the diminution of activity abroad. Most of the mines in the Kansas district are in operation, and an optimistic tone prevails as to the immediate future. Local stocks are said to be small.

# PRODUCTION AND TRANSPORTATION STATISTICS

## CHESAPEAKE & OHIO RY.

The following is a comparative statement of the coal and coke traffic from the New River, Kanawha and Kentucky districts for June and the twelve months ending June 30, 1913 and 14, in short tons:

| | June | | | | Twelve Months | | | |
|---|---|---|---|---|---|---|---|---|
| Destination | 1914 | % | 1913 | % | 1914 | % | 1913 | % |
| Tidewater | 322,008 | 18 | 253,448 | 16 | 3,560,350 | 19 | 3,531,202 | 22 |
| East | 172,686 | 10 | 192,316 | 12 | 2,561,809 | 14 | 2,549,552 | 16 |
| West | 1,192,911 | 65 | 1,067,682 | 66 | 11,554,335 | 61 | 9,221,463 | 57 |
| Total | 1,687,605 | | 1,513,446 | | 17,676,494 | | 15,302,217 | |
| From Connections | | | | | | | | |
| Bituminous | 135,357 | 7 | 91,617 | 6 | 1,169,979 | 6 | 729,741 | 5 |
| Anthracite | 1,669 | | 1,794 | | 16,263 | | 15,746 | |
| Total | 1,824,631 | 100 | 1,606,857 | 100 | 18,862,736 | 100 | 16,047,704 | 100 |
| Coke | 29,392 | | 30,015 | | 388,752 | | 315,474 | |

## NORFOLK & WESTERN RY.

The following is a statement of coal handled by the N. & W. Ry. during July and the past four months of the current year in short tons:

| | April | May | June | July |
|---|---|---|---|---|
| Pocahontas Field | 1,156,670 | 1,239,653 | 1,245,440 | 1,314,478 |
| Tug River District | 221,344 | 263,155 | 244,342 | 263,240 |
| Thacker District | 232,181 | 280,148 | 261,248 | 288,643 |
| Kenova District | 96,116 | 101,768 | 97,352 | 100,600 |
| Clinch Valley District | 156,502 | 150,916 | 156,028 | 140,751 |
| OTher N. & W., Territory | 2,827 | 2,596 | 2,337 | 2,735 |
| Total N. & W. Fields | 1,865,640 | 2,038,236 | 2,006,747 | 2,110,447 |
| Williamson & Pond Creek R.R. | 79,828 | 74,875 | 76,822 | 90,819 |
| All other railroads | 171,818 | 225,561 | 232,387 | 301,796 |
| Grand total | 2,117,286 | 2,338,672 | 2,315,956 | 2,503,062 |

Destination of shipments over this road for July and the first seven months of this year and last year were as follows in short tons:

| | July | | Seven Months | |
|---|---|---|---|---|
| Coal | 1913 | 1914 | 1913 | 1914 |
| Tidewater, foreign | 155,762 | 140,848 | 1,032,082 | 1,062,893 |
| Tidewater, coastwise | 321,340 | 279,708 | 2,224,658 | 2,241,934 |
| Domestic | 1,805,368 | 1,082,506 | 10,457,182 | 11,714,556 |
| Coke | | | | |
| Tidewater, foreign | 4,358 | 182 | 27,199 | 197 |
| Domestic | 122,716 | 88,325 | 940,517 | 668,978 |
| Total | 2,409,544 | 2,591,569 | 14,681,638 | 15,688,558 |

Distribution of shipments for June and July compare as follows:

| | June | | | July | | |
|---|---|---|---|---|---|---|
| | Shipped | Tipple | Total | Shipped | Tipple | Total |
| Pocahontas | 1,136,568 | 14,804 | 1,151,372 | 1,212,483 | 16,138 | 1,228,621 |
| Tug River | 242,208 | 2,134 | 244,342 | 260,141 | 3,099 | 263,240 |
| Thacker | 214,595 | 9,968 | 224,563 | 235,410 | 7,633 | 243,043 |
| Kenova | 88,455 | 8,897 | 97,352 | 89,953 | 10,647 | 100,600 |
| Total | 1,681,826 | 35,803 | 1,717,629 | 1,797,987 | 37,517 | 1,835,504 |

Shipments of coke, entirely from the Pocahontas field, amounted to 59,370 tons in June, as compared with 62,097 tons

## BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during May, June and July of this year and last year:

| | May | | June | | July | |
|---|---|---|---|---|---|---|
| | 1914 | 1913 | 1914 | 1913 | 1914 | 1913 |
| Coal | 2,995,812 | 2,357,119 | 2,380,795 | 3,061,929 | 2,594,407 | 2,938,723 |
| Coke | 301,163 | 434,898 | 298,237 | 396,920 | 255,650 | 391,485 |
| Total | 3,296,975 | 2,792,975 | 2,769,032 | 3,458,849 | 2,850,057 | 3,330,208 |

**I. C. C. Nos. 5558 and 5558 Sub. No. 1—Hughes' Creek Coal Co. and Kelly's Creek Colliery Co. vs. Kanawha & Michigan Ry. C.**

In the sub-numbered case, Kelly's Creek Colliery Co. vs. Kanawha & Michigan Ry. Co., the Commission originally held that the defendants should establish through routes and joint rates between stations on the Kanawha & Michigan Railway and its branches and the points specified in the complaint in eastern and southeastern territory on the lines of the Chesapeake & Ohio and its connections, and that as reasonable rates for these routes defendants should apply rates not in excess of those applying to these destinations for shipments from the mines on the Chesapeake & Ohio. Upon reconsideration of the case; **Held,** That there may properly be a slight difference between the rates applicable to the through routes ordered and those applicable to the single movement on the Chesapeake & Ohio.This difference should not exceed 5c. per ton.

**Suspension Docket No. 321—Coal rates from Virginia mines.**

1. The rates on coal from the mines in the St. Charles, Va., group to points north of the Ohio River within 400 miles from St. Charles should not exceed the rates from the Middlesboro-Jellico group to said destinations by more than 10c. per ton; beyond that the differential should decrease not less than 1c. for each additional 100 miles.

2. The rates on coal from the mines in the Appalachia group and the mines at Benham, Ky., should not exceed the rates from the Middlesboro-Jellico group to points north of the Ohio River by greater amounts than the present differentials, provided that the differentials of Appalachia over Middlesboro-Jellico, should in no case be less than the differentials of St. Charles over Middlesboro-Jellico.

3. The prescribed differentials being maxima, the carriers are at liberty to establish smaller ones whenever commercial conditions may so require.

4. Respondents required to cancel rates exceeding those prescribed in the report, but suspension order vacated as to all other rates named in the tariff under suspension.

# FOREIGN MARKETS

### ITALY

The Italian imports of coal and coke for the past three years were, in English tons: In 1911, 692,577 tons; in 1912. 770,592 tons; in 1913, 825,293 tons.

Imports of coal by countries for the past three years were as follows:

| Country | 1911. | 1912. | 1913. |
|---|---|---|---|
| Austria-Hungary | 85,363 | 177,307 | 133,838 |
| Belgium | 23,160 | 24,363 | 4,358 |
| France | 100,110 | 170,565 | 164,674 |
| Germany | 442,935 | 889,501 | 949,113 |
| United Kingdom | 8,767,352 | 8,637,219 | 9,386,159 |
| Netherlands | 157,676 | 75,494 | 72,564 |
| United States | 14,068 | 68,032 | 93,529 |
| Other Countries | 5,218 | 14,747 | 6,625 |
| Total | 9,595,882 | 10,057,228 | 10,810,860 |

### ENGLAND

**Movement very irregular due to the heavy burden on the railroads. Prices fluctuating though a runaway market has been avoided. Considerable stocking for emergencies.**

The London coal trade has suffered a good deal from the effect of the war. Business generally has been seriously interfered with, and consignments have been very irregular. The railways have undoubtedly risen in a marvellous way in their endeavors to cope with the enormous military traffic, but it has meant in many cases a sad delay in getting coal traffic forward. The southern lines have had great quantities of empty coal trucks waiting at various points, and in the meantime, very few collieries have had their full complement of empties to work with, besides which loaded wagons have waited sometimes a day or more before they can be removed from the colliery sidings.

Prices continue very irregular, but as a general rule the trend of market quotations is lower this week than last. Many of the Yorkshire collieries are offering both house coal and hard steam coal freely on the London market, and as a rule the natural outlet for these qualities is coastwise, or for export. The tendency last week was undoubtedly towards an advance in pit prices, but the extra quantity offering during the current week has distinctly checked all movements in that direction, and more than balanced the demand and the supply.

The depots still report an enormous quantity of unexecuted orders from the general public, the result of the first rush for coal when the war first broke out, but in many cases merchants are now delivering only the coal that is actually paid for, and making that a condition for entering the larger orders received at the time of the scare. The main object of the offer recently made by Messrs. Rickett, Smith and Messrs. G. J. Cockerell and Co. to place 350,000 tons of coal at the disposal of the Government at $5.76 and $6 per ton for the north and south respectively, of the Thames is to prevent or relieve distress for want of fuel during the coming winter.

One of the most serious aspects of the war as it affects the London trade is the closing of so many of the North London stations to the general public for so many days, whilst the troops and ammunition, together with the horses, baggage, field guns and accoutrements, are being moved from one place to another.

### RUSSIA

Imports of coal and coke into Finland for the last two years were reported as follows in metric tons:

| | Coal | | Coke | |
|---|---|---|---|---|
| From | 1912 | 1913 | 1912 | 1913 |
| United Kingdom | 457,385 | 497,636 | 10,012 | 24,342 |
| Russia | 278 | ..... | 62 | ..... |
| Sweden | 918 | 909 | 176 | ..... |
| Germany | 5,190 | 13,874 | 13,930 | 20,150 |
| Netherlands | 23,727 | 22,611 | 5,055 | 3,755 |
| Belgium | 412 | ..... | 1,565 | ..... |
| Total | 487,911 | 536,975 | 30,801 | 48,638 |

# FINANCIAL

## Delaware & Hudson Co.

This company reports in part for the calendar year of 1913, as follows:

During 1913 this company mined 7,170,553 gross tons of anthracite, out of 69,069,628, including product of washeries, produced in the region, or 731,998 more than in 1912, when production was reduced by suspension of mining from Apr. 1 to May 21. During 1913 there were ten strikes which caused temporary idleness of one or more collieries, loss of time being equivalent to closing of one colliery 491 hr., or 54 5-9 working days.

This company has endeavored to conduct mining operations with adequate regard to protection against caving. Recent discussion, particularly in Scranton, has been accompanied by extreme demands which, if admitted would greatly enhance cost per ton recovered and materially reduce ultimate proportion of total in ground that could be made available.

Causes, some of them legislative, and all beyond control of railway managers, which during recent years have enhanced difficulties attending effort to maintain reasonable margin between revenues and expenses, were not less effective during the year. Increases in wags, consequent on arbitrations which, although nominally requiring voluntary acquiescence of railways, really operate, under ordinary circumstances, with compulsory force, supplemented by reductions in hours of labor and relaxations in conditions necessary to secure from each unit of labor its maximum of reasonable efficiency, and increases in prices of materials and supplies, themselves mainly attributable to higher wages and lower efficiency of labor, have greatly augmented expenses. At the same time the taxing authorities have continued to impose a heavier proportion of steadily rising expenditures of government. Concurrently, the process of attacking rate schedules in detail, reducing here a rate and there a group of rates, has operated to reduce gross.

BALANCE SHEET DECEMBER 31.

| Assets | 1913 | 1912 | Liabilities— | 1913 | 1912 |
|---|---|---|---|---|---|
| Unmined coal owned and controlled | $15,943,915 | $16,397,24 | Capital stock | $42,503,000 | $42,503,000 |
| Advances on unmined coal | 354,279 | 354,033 | Bonds(see "Ry & ind."Sec | 57,920,000 | 58,171,000 |
| Real estate | 805,713 | 805,850 | Loans payable | 4,500,000 | 3,500,000 |
| Road & equip. D. & H. Co. | 67,175,113 | 65,814,079 | Int., divs., etc. accrued | 1,407,986 | 1,405,209 |
| Canad'n lines | 6,464,030 | 6,331,868 | Int., divs. and bonds due, not yet collected | 227,143 | 195,087 |
| Marine equipt | 5,931 | 6,726 | Accrued taxes. | 277,798 | 157,042 |
| Coal dept. equip. | 1,338,400 | 1,303,362 | Spec. res've fd. accounts | 10,073 | 9,738 |
| Coal-handling stor'ge plants | 63,968 | 61,134 | Audited vouch and pay-rolls | 2,940,797 | 3,052,054 |
| Stocks & bds. | *28,100,594 | 27,088,094 | Other accts. payable | 638,977 | 552,480 |
| Cash | 1,646,654 | 1,182,560 | Add'ns t oprop erty prior to June 30, 1907 | | |
| Fire insurance fund | 417,615 | 373,905 | through inc | 6,839,487 | 6,751,837 |
| Spec. res. fund | 10,073 | 9,739 | Profit and loss | 18,153,210 | 15,199,924 |
| Equip.trust fd | 1,705,235 | 1,441,303 | | | |
| Sup. on hand | 3,330,997 | 2,781,673 | | | |
| Bills & Accts. rec | 3,810,661 | 4,118,197 | | | |
| Ad., new lines | 4,275,293 | 3,427,608 | | | |
| Total | 135,418,471 | 131,497,371 | Total | 135,418,471 | 131,497,371 |

*The total par value of stocks owned in 1913 was $27,365,874, against $26,178,283 in 1912 (value as per balance sheet in 1913, $23,375,797; par value of bonds, $4,950,716 in 1913 and 1912 (value as per balance sheet in 1913, $4,724,796). The list of securities owned remains substantially the same as that given in V. 88, p. 939, the main change being in Hudson Coal Co. stock, $3,500,000 (increased from $100,000), and the additional Wilkes-Barre Connecting R.R. Co., $50,000; and bonds, the new items of Champlain Transportation first income debentures ($250,000), Fort William Henry Hotel Co., income debentures ($272,000), Bluff Point Land Improvement Co. income debentures ($250,000) and Chateaugay Ore & Iron Co. first mortgage ($281,000).

**Note**—For last previous annual report of this company see "Coal Age," Vol. 3, p. 980.